DOCUMENT RESUME

ED 452 630 EC 308 387

TITLE	Substance Abuse and Learning Disabilities: Peas in a Pod or Apples and Oranges?
INSTITUTION	Columbia Univ., New York, NY. National Center on Addiction and Substance Abuse.
SPONS AGENCY	National Inst. on Drug Abuse (DHHS/PHS), Rockville, MD.; National Center for Learning Disabilities, Inc., New York, NY.
PUB DATE	2000-09-00
NOTE	44p.; This CASA White Paper is based on the National CASA Conference "Substance Abuse and Learning Disabilities: Peas in a Pod or Apples and Oranges?" (New York, NY, February 1, 1999). Also funded by the Ira Harris Foundation.
AVAILABLE FROM	Columbia Univ., National Center on Addiction and Substance Abuse, 633 Third Ave., New York, NY 10017-6706; Web site: http://www.casacolumbia.org.
PUB TYPE	Information Analyses (070) -- Reports - Evaluative (142)
EDRS PRICE	MF01/PC02 Plus Postage.
DESCRIPTORS	Adolescents; Alcoholism; *Behavior Disorders; Children; *Disability Identification; Drug Abuse; Drug Addiction; *Drug Therapy; Etiology; *Learning Disabilities; Multiple Disabilities; Research Needs; Student Characteristics; *Substance Abuse

ABSTRACT

This paper was developed as a result of a 1999 conference on substance abuse and learning disabilities. An introductory chapter urges early identification of learning disabilities and appropriate treatment for both problems when they co-exist. The second chapter discusses the differences between learning disabilities and behavioral disorders, the size of the problem of substance abuse in this population, financial and social costs to society, and possible negative outcomes of unnecessary drug treatment of children with learning disabilities. The third chapter examines the question of whether substance abuse leads to learning disabilities and/or behavioral disorders or the reverse. Evidence for the following three theories is reviewed: (1) behavioral effects of learning disabilities are also risk factors for substance abuse; (2) learning disabled children turn to drugs for self medication; and (3) children on psychoactive medication are more likely to believe in the positive effects of drugs. Also examined are the possibilities that behavioral disorders among children lead to parental substance abuse and that learning disabilities and substance abuse are the result of a common cause. The paper urges research with refined diagnostic criteria and greater efforts to inform parents, physicians, teachers, and treatment providers. (Contains approximately 210 references and 101 notes.) (DB)

Reproductions supplied by EDRS are the best that can be made
from the original document.

ED 452 630

The National Center on
Addiction and Substance Abuse
at Columbia University

633 Third Avenue
New York, NY 10017-6706

phone (212) 841-5200
fax (212) 956-8020
http://www.casacolumbia.org

Board of Directors

Joseph A. Califano, Jr.
Chairman and President

Columba Bush
Kenneth I. Chenault
James Dimon
Mary Fisher
Douglas A. Fraser
Leo-Arthur Kelmenson
Donald R. Keough
David A. Kessler, M.D.
LaSalle D. Leffall, Jr., M.D.
Manuel T. Pacheco, Ph.D.
Joseph J. Plumeri, II
Nancy Reagan
E. John Rosenwald, Jr.
George Rupp, Ph.D.
Michael P. Schulhof
Louis W. Sullivan, M.D.
Michael A. Wiener

Founding Directors

James E. Burke (1992-1997)
Betty Ford (1992-1998)
Barbara C. Jordan (1992-1996)
Linda Johnson Rice (1992-1996)
Michael I. Sovern (1992-1993)
Frank G. Wells (1992-1994)

Substance Abuse and Learning Disabilities:

Peas in a Pod or Apples and Oranges?

September 2000

Funded by:
National Institute on Drug Abuse
National Center for Learning Disabilities
The Ira Harris Foundation

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)

☐ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY

David Man

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

EC 308387

BEST COPY AVAILABLE

Board of Directors

Columba Bush
First Lady of Florida

Joseph A. Califano, Jr.
Chairman and President of CASA

Kenneth I. Chenault
President and Chief Operating Officer, American Express Company

James Dimon
Chairman and CEO, Bank One Corporation

Mary Fisher
Mary Fisher Care Fund

Douglas A. Fraser
Professor of Labor Studies at Wayne State University
(former President of United Auto Workers)

Leo-Arthur Kelmenson
Chairman of the Board of FCB Worldwide

Donald R. Keough
Chairman of the Board of Allen and Company Incorporated
(former President of The Coca-Cola Company)

David A. Kessler, M.D.
Dean of Yale University School of Medicine

LaSalle D. Leffall, Jr., M.D., F.A.C.S.
Charles R. Drew Professor of Surgery, Howard University Hospital
(Past President of the American Cancer Society and Past President of the American College of Surgeons)

Manuel T. Pacheco, Ph.D.
President of The University of Missouri

Joseph J. Plumeri II

Nancy Reagan
Former First Lady

E. John Rosenwald, Jr.
Vice Chairman of The Bear Stearns Companies Inc.

George Rupp, Ph.D.
President of Columbia University

Michael P. Schulhof

Louis W. Sullivan, M.D.
President of Morehouse School of Medicine

Michael A. Wiener
Founder and Chairman Emeritus, Infinity Broadcasting Corporation

Founding Directors
James E. Burke (1992-1997)
Betty Ford (1992-1998)
Barbara C. Jordan (1992-1996)
Linda Johnson Rice (1992-1996)
Michael I. Sovern (1992-1993)
Frank G. Wells (1992-1994)

Copyright © 2000. *All rights reserved. May not be used or reproduced without the express written permission of The National Center on Addiction and Substance Abuse at Columbia University.*

Table of Contents

Accompanying Statement i
Foreword iii
I. Introduction 1
II. Is There a Cause for Concern? 3
What are Learning Disabilities and Behavioral Disorders? 3
How Big is the Problem? 4
Why Do We Care? 5
Are We Compounding the Problem? 6
III. What's the Link? 7
Does Substance Abuse Lead to Learning Disabilities and/or Behavioral Disorders? 7
Do Learning Disabilities and/or Behavioral Disorders Lead to Substance Abuse? 8
Theory 1: Behavioral Effects of Learning Disabilities are also Risk Factors for Substance Abuse 8
Theory 2: Learning Disabled Children Turn to Drugs for Self Medication 9
Theory 3: Children on Psychoactive Medication are More Likely to Believe in the Positive Effects of Drugs 9
Can Behavioral Disorders Among Children Lead to Parental Substance Abuse? 10
Are Learning Disabilities and Substance Abuse the Result of a Common Cause? 10
IV. What are the Limits of Our Knowledge? 11
V. Where Do We Go From Here? 13
Notes 15
References 20

Accompanying Statement
by Joseph A. Califano, Jr.
Chairman and President

CASA's conference, *Substance Abuse and Learning Disabilities: Peas in a Pod or Apples and Oranges*--with its examination of the link between these conditions and its discussion of the extensive overlap among substance abuse, learning disabilities and substance abuse--signals the need for immediate action to protect children with learning disabilities from falling prey to drug, alcohol and tobacco use.

Learning disabilities affect up to 20 percent of American school age children--10.8 million of the 54 million such children. Because the characteristics of learning disabled children--reduced self-esteem, academic difficulty, loneliness, depression and the desire for social acceptance--closely mirror the risk factors for substance abuse, we need immediate action on two fronts:

First, as a matter of substance abuse prevention, it is imperative to identify learning disabilities in children as early as possible and to deal with them promptly. By doing so, we will reduce the likelihood that such children will drink alcohol, smoke cigarettes or abuse drugs.

Second, children with learning disabilities who fall prey to substance abuse and addiction must receive treatment tailored to deal with both their problems.

This White Paper grew out of a daylong conference held on February 1, 1999 in New York City which featured remarks from leading experts in the medical, education and treatment communities. CASA joined with the National Center for Learning Disabilities and the National Institute on Drug Abuse to host this conference and bring together the latest research on the connection between substance abuse and learning disabilities.

This conference was the first for CASA CONFERENCES, a new venture at CASA that seeks to encourage interested individuals--public

officials, local leaders, researchers and concerned citizens--to develop more effective policies and to raise public awareness among professionals in various fields. In March of 2000 we hosted, at the Ronald Reagan Presidential Library, Substance Abuse in the 21st Century: Positioning the Nation for Progress, the first ever comprehensive conference to explore every facet of the substance abuse problem in America. CASA is now planning a similar conference that will take place on the East Coast in the Winter of 2002. CASA CONFERENCES will hold an all-day session on Substance Abuse and Eating Disorders on Juanuary 23, 2001. With the Century Foundation, we are planning a conference on Substance Abuse and Gambling later that year. Also on the drawing board, are CASA CONFERENCES on Substance Abuse and Domestic Violence and Substance Abuse and Suicide.

We thank the National Institute on Drug Abuse, the National Center for Learning Disabilities and The Ira Harris Foundation for the financial support that made both the conference and this White Paper possible. I especially wish to thank Anne Ford, the Chairman of the Board of The National Center for Learning Disabilities, for her tireless commitment to the cause and her invaluable assistance on this project and Dr. Alan Leshner, the distinguished and dedicated Director of the National Institute on Drug Abuse for his key role in the conference and for writing the Foreword to this White Paper.

Dr. Patrick Johnson, CASA Fellow, and Justin Bernbach, my Special Assistant, did the staff work for this paper with the support of Grace Kim, a Columbia Univeristy student intern, and others at CASA. Susan Foster, Vice President and Director, Policy Research and Analysis, edited the report. Many individuals were involved with this undertaking, but as always, CASA is responsible for the analysis and findings in this report.

--Joseph A. Califano, Jr.

Foreword

by Alan I. Leshner, Ph.D.
Director
National Institute on Drug Abuse

The relationship between learning disabilities and substance abuse is a subject about which we know very little. We do know that there is a great deal of stigma attached to both drug abuse and addiction and learning disabilities. This problem of stigma may help explain why it has not yet been well researched.

The subject, however, demands attention because the implications are tremendous. As many as 20 percent of school age children may suffer from a learning disability. A large number of these children also suffer from a behavioral disorder. If there is reason to believe that these children may be more likely to take drugs, we need to know and we need to understand the relationship as thoroughly as possible.

Understanding the relationship may help us better understand the motivation of a very large number of drug users. People use drugs for two basic reasons. Some use them simply to seek novelty. Others use them to alleviate the pain and stress of a difficult life situation, to self-medicate. Some children and teens may well use drugs to deal with the negative consequences of a learning disability or behavioral disorder. By identifying those who are at risk for using drugs as well as their motivation for doing so, we can develop more effective and appropriate prevention and treatment programs.

Establishing the precise nature of the relationship between substance abuse and learning or behavioral disorders can also help to solve one of the biggest public policy problems this country faces: the fractionated service systems available for drug addicts with a comorbid condition. People who are addicted to drugs, people with mental disorders, people with liver problems and people with learning disabilities typically go to a different place for

each type of services. But often the people affected will require several different services at once. If we can achieve a better understanding of the way substance abuse relates to other conditions, we can begin to develop a more effective, comprehensive approach to treatment and prevention and we can move toward a unified service system in which the substance abuser can more easily get all the help he needs.

The first question that needs to be answered is, Is there actually a relationship between learning disabilities and substance abuse? We can feel pretty confident in saying that there is. What we don't know is the precise relationship. So now we need to tackle a more difficult set of questions.

Does having a learning disability increase an individual's vulnerability to start using drugs? If so, what is the dynamic mechanism by which they are related? Does a learning disability increase the chance that a person will become addicted to drugs? Do drugs compound existing learning disabilities?

This CASA White Paper begins to flesh out these questions in order to provide a blueprint for future research. Last year's conference and this paper have presented the questions. Now is the time to start finding the answers.

Chapter I
Introduction

This White Paper grew out of a national conference entitled *Substance Abuse and Learning Disabilities: Peas in a Pod or Apples and Oranges?* held on February 1, 1999 in New York City. While the conferees were not able to identify the precise link between substance abuse and learning disabilities or the nature of this link, this much is clear: there is enough evidence to alert parents, teachers, pediatricians and all those who deal with children that learning disabilities may increase the risk for substance abuse.

That evidence makes two things seem clear that demand action now:

First, as a matter of substance abuse prevention, it is imperative to identify learning disabilities in children as early as possible and to deal with them promptly. By doing so, we will reduce the likelihood that such children will suffer lower self-esteem, social difficulties and poor academic performance which can hike the risk of substance abuse.

Second, children with learning disabilities who fall prey to substance abuse and addiction must receive treatment tailored to deal with both their problems.

The link begins in the womb. Prenatal smoking, drinking and drug use can seriously damage the fetus. CASA's 1996 report, *Substance Abuse and the American Woman*, found that children prenatally exposed to cigarettes had lower intelligence scores and more behavioral problems, such as anxiety, disobedience, and difficulty concentrating and relating to other children.

Alcohol use during pregnancy is the leading cause of mental retardation in children.[1] Drinking during pregnancy can produce Fetal Alcohol Syndrome[2], Fetal Alcohol Effects,[3] low birth weight,[4] learning disabilities,[5] Attention Deficit Disorder (ADD) and Attention Deficit Hyperactivity Disorder (ADHD).[6] Some experts believe that alcohol has in some way harmed

between one-third and two-thirds of all children in special education.

Children whose mothers drink, drug and smoke during pregnancy are likelier to have learning disabilities, ADD and ADHD.[7] Children of alcoholics and drug addicts are themselves more likely to become alcoholics and drug addicts.[8] Despite the compelling coincidence of learning disabilities and substance abuse, we know remarkably little about the relationship. There are, however, some compelling facts:

FACT: Children with learning disabilities are at greater risk of school failure and often experience difficulty and frustration relating to others.[9] These children are more likely to perceive themselves as poor students and engage in negative and disruptive behavior, and less likely to be involved in extracurricular activities.[10] Academic failure and peer rejection are common risk factors associated with substance abuse,[11] so is the lower self esteem that accompanies social difficulty and academic failure.[12]

FACT: A child with a learning disability is twice as likely as a member of the general population to suffer Attention Deficit Disorder.[13] ADHD affected individuals have a high incidence of substance abuse,[14] and ADHD is further associated with an earlier onset of substance abuse and a greater difficulty shaking addiction.[15]

FACT: Studies show that as many as half of those suffering ADHD self-medicate with drugs and alcohol.[16] An individual with ADHD is twice as likely as one without ADHD to abuse substances.[17]

FACT: Individuals in substance abuse treatment have a higher incidence of learning disabilities than the general population.[18] One recent study revealed that 40 percent of people in substance abuse treatment have a learning disability[19], while another indicated that in residential substance abuse treatment programs, the percentage of learning disabled people has been found to be as high as 60 percent.[20]

Correlation is not causation, but such a high statistical coincidence raises enough suspicion to warrant further investigation and prudence requires action by parents, teachers and others who care for the nation's children.

Chapter II
Is There Cause for Concern?

Learning disabilities affect up to 20 percent of school age children in the United States, some 10.8 million of the 54 million such children.[21] Behavioral disorders also affect up to 20 percent of school age children. The overlap of these two conditions in children is extensive, but estimates vary widely due to imprecise diagnostic criteria and a lack of data.[22] What is clear is that the characteristics of learning disabilities--reduced self-esteem, academic difficulty, loneliness, depression and the desire for social acceptance--mirror the risk factors for substance abuse.[23] Prudence requires parents and teachers to recognize learning disabilities as early as possible to keep children from falling prey to drug and alcohol abuse. If learning disabled children do succumb to substance abuse, they need treatment that deals with both conditions simultaneously.

This cluster of conditions--learning disabilities, behavioral disorders and substance abuse--imposes serious costs on society and on individual families.[24] The costs to society are reflected in higher education and health care costs, lost productivity in the workplace and, in the case of serious behavioral disorders, increased crime.[25] Any one of these disorders can wreak havoc with families struggling to compensate for learning disorders, cope with behavioral disorders or survive the devastating consequences of substance abuse and addiction. Two or three together can devastate a family and mount a whopping tab for taxpayers.

A better understanding of the nature of the links between learning disabilities, behavior disorders and substance abuse is critical if we are to develop strategies for prevention and treatment in order to avoid these costly human and economic consequences.

What are Learning Disabilities and Behavioral Disorders?

Learning disabilities are conditions of the brain that affect a person's ability to take in, process or

express information.[26] A learning disability is defined as "a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, which may manifest itself in an imperfect ability to listen, think, speak, read, write, spell or to do mathematical calculations."[27] Learning disorders are neither deficits of mental capacity nor impairments of the senses and should not be confused with handicaps such as mental retardation, autism, deafness or blindness.[28]

There are four main categories of learning disabilities: reading disorders, mathematics disorders, disorders of written expression and learning disorders not otherwise specified.[29] For the first three categories, the disorder is suspected when an individual's achievement in reading, math or writing is "substantially below that expected given the person's chronological age, measured intelligence and age-appropriate education."[30] The more general category of unspecified learning disabilities refers to individuals whose overall academic achievement remains lower than expected even though achievement in each individual category is basically average.[31] As these definitions suggest, the learning disorders are not precisely identified. Consequently, the learning disabled are a highly heterogeneous group.

Conditions That May Occur With a Learning Disability

- Intermittent Explosive Disorder
- Anxiety Disorder
- Conduct Disorder
- Attention Deficit Hyperactivity Disorder (ADHD)
- Problems with anger

Behavioral disorders often appear in combination with these learning disorders.[32] The most common behavioral disorders--and the most thoroughly studied--are Attention Deficit/Hyperactivity Disorder (ADHD) and Conduct Disorder (CD).[33] To be diagnosed with ADHD,[34] a child must exhibit a combination of several symptoms of either inattention or hyperactivity-impulsivity over an extended period of time. ADHD generally involves an unwillingness or inability to sit down, be quiet or pay attention in social situations.[35] Conduct Disorder involves a set of more aggressive and destructive behaviors than those exhibited in ADHD; that is, active interference with the rights of others and aggressive or unreliable behavior.[36]

In both ADHD and Conduct Disorder, the behavior is persistent over time and impairs the child's social, academic or occupational functioning.[37] Some evidence suggests that Conduct Disorder in children may foreshadow more serious forms of antisocial behavior as they become adults.[38]

Correctly diagnosing these disorders in children is difficult because the symptoms often overlap with one another[39] and because many of them are similar to behaviors that may be considered common in immature children and teens.[40]

The tendency of these disorders to occur together, known scientifically as comorbidity, has considerable implications for understanding the connection. Studies to date on the link between learning disabilities and substance abuse have not controlled adequately for the effects of behavioral disorders.[41] As a result, it remains unclear whether results attributed to learning disabilities are instead the result of behavior disorders or of the interaction between the two sets of disorders.

How Big is the Problem?

As many as 20 percent of school age children--10.8 million of the 54 million children[42] in that category--may suffer from a learning disability.[43] Many of these children also have behavioral disorders, although the precise degree to which they overlap is not known. Estimates of the number of children with behavioral disorders vary widely, from 1 to more than 20 percent of the school age population.[44]

A child with either a learning disorder or a behavioral disorder is more than twice as likely as the general population to have the other

disorder.[45] One study of 445 randomly selected ninth graders revealed that about 2.5 percent had both Attention Deficit Disorder and a reading disability. Fifteen percent of those with reading disabilities had ADD, while 36 percent of those with ADD had a reading disability. These prevalence rates were far higher than the rates for the entire sample: seven percent with ADD and 17 percent with a reading disability.[46] Other research has yielded very similar rates of co-occurrence of these conditions.[47]

Why Do We Care?

Substance abuse is the number one public health care problem in America today[48] costing society $500 billion each year.[49] Sixty-one million Americans are hooked on cigarettes, and fourteen million either abuse, or are addicted to, alcohol.[50] Nearly 14 million use illegal drugs and about five or six million of them abuse or are addicted to drugs such as heroin, cocaine and amphetamines.[51] The bill for American taxpayers is enormous. Alcohol and drugs accounted for more than $34 billion in health care expenditures in 1995,[52] while tobacco added at least $30 million to the tab.[53] Substance abuse and addiction also account for most of the costs of the nation's prisons and jails,[54] consume about 70 percent of spending on child welfare,[55] reduce worker productivity by billions of dollars each year and destroy families throughout the country.[56]

Learning disabilities and behavioral disorders impose two basic costs on the public: the expense of educating children in a special education environment and lost productivity of learning disabled adults in the workforce. Some of the more extreme cases of Conduct Disorder may be precursors to violent, criminal behavior that imposes additional societal costs.

According to the U.S. Department of Education, the excess costs of special education--that is, the cost beyond that required to educate a child without disabilities in 1997--was $5,435 per pupil.[57] Children in special education are divided into three categories: learning disability (LD), emotional disturbance (ED) and other health impairment (OHI).[58] In 1996, there were 2.6 million children receiving special education for learning disabilities, making the direct cost of learning disabilities on the education system approximately $14 billion a year. [About 26 percent (674,701) of these 2.6 million children also have ADHD.] Another 241,746 children with ADHD were in one of the other two special education categories--ED or OHI--accounting for an additional $1.3 billion a year in special education costs.[59] Children with behavioral disorders who remain in regular classrooms may also impose indirect costs on the education system by damaging property, harming other students or disrupting classes and slowing the pace of instruction. It is more difficult to assess the costs of learning disabilities and behavioral disorders on worker productivity.

The financial costs to society are only half of the problem; the personal costs are devastating. Drugs and alcohol are implicated in virtually every problem that tears at the social fabric of America, contributing to domestic violence,[60] fostering child abuse and neglect[61] and increasing the chances of teen pregnancy.[62]

Learning disabilities and behavioral disorders also have vast potential to disrupt the normal functioning of a family.[63] While the personal costs of learning disabilities cannot compare to those related to substance abuse, they are substantial nonetheless. They can contribute to a child's isolation and unhappiness.[64] In some families, parents may turn away from their developmentally disabled child while focusing their love on their "normal" children. Conversely, parents may lavish attention on a troubled child, feeding resentment among the child's siblings.

In combination, the costs are compounded. If we can better understand how substance abuse is related to learning disabilities and behavioral disorders, we can invest more effectively in prevention and sharply limit the greater costs that are sure to appear further down the road. Whether we can control these costs depends, of course, on whether these are preventable conditions.

Substance abuse clearly is preventable. Effective treatment and prevention programs both in the home and at school can lower drug

use rates among children and teens.[65] Whether learning disabilities and behavioral disorders can be prevented depends on the relative importance of genetic and environmental factors in causing these disorders. Some evidence suggests that, at a minimum, proper precautions taken during pregnancy--including abstinence from alcohol, tobacco and illegal drugs--can help to prevent these disorders.[66]

Are We Compounding the Problem?

A further reason for concern relates to the current controversy surrounding the use of prescription medications to treat children for behavioral problems such as ADHD and learning disabilities. Most recently, national attention focused on a study reporting a sharp increase in the use of medication to treat young children before they even enter school.[67]

There can be little doubt that medication is appropriate for many children with these conditions. In fact, as we study the link between behavioral disorders and substance abuse, it is important to note that a child who is successfully treated with medication may never suffer the emotional problems such as shame and low self-esteem that may predispose him to future drug use.[68]

In some quarters, however, the suspicion remains that many children receive medication that they do not need.[69] Unnecessary medication can be harmful because the safety issues and side effects of these medications are often not understood fully, especially as they relate to young children. In fact, bottles of Ritalin (used to treat ADD/ADHD) bear the following warning: "Ritalin should not be used in children under six years, since safety and efficacy in this age group have not been established."[70]

Two other possible consequences of unnecessary medication are especially relevant to a discussion of the relationship of these conditions to substance abuse. First, if doctors are truly engaged in the medicalization of normal behaviors, then many normal children will be unfairly diagnosed with behavioral disorders at an early age. This unnecessarily can contribute to low self-esteem, peer rejection, despair and other factors that may make the child more vulnerable to substance abuse.[71] Second, the children receiving the medication may be convinced at an early age that drugs are the primary way to treat all of their problems. This could make them more likely to turn to illegal drugs or alcohol in the future.[72]

Chapter III
What's the Link?

While research has not determined a causal link between learning disabilities and substance abuse, there is a good deal of evidence that a correlation exists between the two. This link may work in one of three ways: learning disabilities and/or behavioral disorders may cause or contribute to substance abuse by either a child or a parent,[73] substance abuse may cause or contribute to learning disabilities and/or behavioral disorders among children,[74] or both may share a common cause or set of contributing factors.[75] Deciding which of these three possible explanations actually reflects reality is a complex task, especially with the extraordinarily large number of physiological or environmental factors that may contribute to the development of learning disabilities or behavioral disorders or to substance abuse problems.

Does Substance Abuse Lead to Learning Disabilities and/or Behavioral Disorders?

The strongest evidence of a link between learning disabilities and substance abuse comes from studies of prenatal drug exposure. According to the National Institute on Drug Abuse's 1996 National Pregnancy and Health Survey, of the four million women who become pregnant each year, 20.4 percent smoke cigarettes, 18.8 percent drink alcohol and 13 percent use illicit drugs during pregnancy.[76] Children who are exposed to alcohol, tobacco and illicit drugs in the womb are at higher risk for various developmental disorders including learning disabilities.[77] In addition, one study found that mothers who smoked more than half a pack of cigarettes per day during pregnancy were four times more likely to have a child with conduct disorder than mothers who did not smoke.[78]

While the intergenerational relationship between substance use, learning disabilities and behavioral disorders is well established, a more difficult question is whether a child's own use of

drugs or alcohol can lead to the development of a learning disability. One theory posits that alcohol and/or drug use can cause learning disabilities or psychological disorders because drugs affect brain functioning and metabolism.[79] Although there is no clear evidence to support this model, there is a suggestion that drug use interferes with physiological, psychological and emotional functioning.[80]

Establishing this link is complicated by the question of whether learning disabilities are always present at birth or very early childhood or whether they may develop later in life. To answer this question we need to develop more precise diagnostic criteria for learning disabilities.

Drug use also affects peer interactions, which may result in the appearance of a learning disability. Drug users may choose deviant or marginal groups of friends and behave in ways that can be classified as antisocial.[81] Heavy drug use can also impair a child' s academic functioning and success.[82] Over time, such school failure may appear to result from a learning disability rather from drug abuse. Once again, the lack of clear diagnostic criteria and limited training of physicians in diagnosing these disabilities may hinder the ability to diagnose these disorders.

Do Learning Disabilities and/or Behavioral Disorders Lead to Substance Abuse?

Most research into the relationship between learning and behavioral disorders and substance abuse has not focused on direct, physiological links between the two, but rather on environmental forces that may provide the bridge between these conditions. No significant theory has yet been posited that points to a direct, neurological or chemical mechanism or common pathway through which learning disabilities cause substance abuse. However, there are three major theories about how this relationship may work.

Theory 1: Behavioral Effects of Learning Disabilities are also Risk Factors for Substance Abuse

According to several studies, the risk factors for adolescent substance abuse are very similar to the behavioral effects of learning disabilities--reduced self-esteem, academic difficulty, loneliness, depression and the desire for social acceptance.[83] Thus, learning disabilities may indirectly lead to substance abuse by generating the types of behavior that typically lead adolescents to abuse drugs.

Characteristics of Learning Disabled Children

- Low self-esteem
- Poor school performance because of difficulty in writing, reading and/or math
- Depression
- Peer rejection
- Coordination difficulties
- Problems reading social cues in groups

There are several ways in which learning disabilities can lead to these risk factors.[84] For example, learning disabilities will clearly lead to academic difficulty. Academic failure is one of the key causes of peer rejection among teens, and academic failure and peer rejection are among the leading causes of low self-esteem. Adolescents might abuse substances to try and fit in and be accepted by peers.[85]

Risk Factors for Substance Abuse

- Low self-esteem
- Academic trouble and failure
- Loneliness and depression
- Peer pressure/desire for social acceptance

While this theory provides a compelling rationale for further study of a link between learning disabilities and substance abuse, it does not predict any direct link between a learning

disability and a heightened risk of substance abuse. In other words, the mere existence of the learning disability does not increase the likelihood that the child will use drugs. It is only through the behavioral effects of the learning disability that an indirect link with heightened substance abuse risk may be established. For parents and teachers, the implications of this are clear. If parents or teachers are able to work with the child to ameliorate the depression and low self-esteem related to the learning disability, they may be able to counteract the heightened risk of substance abuse.

Overlap of Substance Abuse Risk Factors and LD Characteristics

Risk Factors	Characteristics
Low self-esteem	Low self-esteem
Academic failure	Academic failure
Depression	Depression
Desire for acceptance	Peer rejection

Theory 2: Learning Disabled Children Turn to Drugs for Self Medication

This theory suggests that the child uses drugs to directly counteract neurological disturbances or the feelings of despair and loneliness brought on by the learning disability. For example, adolescents with low self-esteem may use drugs for self-medication purposes--to counter negative feelings associated with social rejection and school failure.[86] Alternatively, some children (including those with hyperactivity) may be born with a deficiency or excess of certain brain chemicals such as neuro-transmitters or neurohormones,[87] and "...might actually abuse drugs to self-medicate their problem."[88] Some specialists believe that people with ADHD medicate themselves with drugs such as alcohol, marijuana, heroin, pain medication, caffeine, nicotine and cocaine to counter feelings of restlessness.[89]

Theory 3: Children on Psychoactive Medication are More Likely to Believe in the Positive Effects of Drugs

A third possible explanation for the heightened risk of substance abuse among children with learning and behavioral disorders is that children who successfully use drugs to treat a learning disability may be more comfortable with, or less troubled by, the idea of drug use in general.[90] In this case, the drug use may not occur simultaneously with the symptoms of the behavioral disorder. Instead, this theory maintains that a child's positive experience with prescription drugs may make it more likely that he will be enticed by the alleged benefits of illegal drugs or alcohol at some future date. Presently, no empirical research supports this theory.

While this theory also deserves a closer look, it seems to contradict the self-medication explanation: to the extent that the drugs taken to treat the learning disabilities or behavioral disorders help to alleviate the negative effects of the child's condition, the use of prescription drugs may make a child less likely to use drugs in the future. A recent NIDA-supported study on Ritalin shows these very results.[91] The study found that boys with ADHD who had received Ritalin were significantly less likely to abuse alcohol and other drugs than those who had not received the medication. This suggests that proper, controlled medication may actually be a protective factor against substance abuse in these individuals. One possible reason is that because the medication reduces a child' s inappropriate social behaviors, the child is less likely to be rejected by his or her peer group. In this way, the medication may indirectly reduce the likelihood that children with ADHD will abuse alcohol and drugs by improving the ways in which they interact with their peers.

Can Behavioral Disorders Among Children Lead to Parental Substance Abuse?

Several recent studies have sought to establish whether parents of children with behavioral disorders may experience heightened stress and,

in turn, drink more alcohol. In three separate studies at the University of Pittsburgh and Florida State University, researchers observed the drinking behavior of three sets of adults--undergraduate students,[92] parents of children without ADHD[93] and parents of children with ADHD[94]--that resulted from interactions with problem children. The adults interacted with children who were instructed either to cooperate with the adults or to behave in a way that approximated ADHD, non-compliant or oppositional behavior. In between the interactions with children, the adults were given an opportunity to drink.

Both the undergraduates and the parents of normal children reported elevated levels of subjective distress and consumed more alcohol after interacting with the uncooperative children. While parents of children with ADHD reported heightened stress levels after interacting with problem children, they did not drink significantly more as a group. Stress-induced drinking was found only among those adults with a family history of alcohol abuse. Among adults with no family history of alcohol abuse, alcohol use actually dropped after interactions with the deviant children.

This research seems to indicate that problem behavior by children may exacerbate preexisting problem drinking by parents.[95] One study indicates that the prevalence of alcohol problems is higher among fathers of boys with certain behavioral disorders than among fathers of boys without these disorders.[96] These studies, however, are far from the final word on the subject. It is unclear to what degree the results from these artificial, laboratory-based studies can be generalized to parents in actual home-based situations. The results provide some clues to this relationship between behavioral disorders and drinking, but more research is required.

Are Learning Disabilities and Substance Abuse the Result of a Common Cause?

As we discussed earlier in this section, the fact that a correlation exists between substance abuse and learning disabilities does not necessarily imply that one causes the other. We must explore the possibility that both the learning disability and the substance abuse are the result of a common cause. Given the large number of potential causes and contributing factors for both learning disabilities and substance abuse, this promises to be a difficult task.

One particular example may be instructive. Substance abuse by the mother during pregnancy can contribute to both physiological and environmental risk factors for learning disabilities and behavioral disorders. Maternal drug use will also affect a child's environment. Growing up in a home with a parent who is a substance abuser will increase the risk that a child will abuse drugs or alcohol himself.[97] In this case, physiological forces cause the learning disability, while the substance abuse is the result of environmental forces. But both are linked to substance abuse by the mother.

However this is only one of many possible common causes. In order to uncover other possible causes, researchers must begin by searching for common factors, both genetic and environmental, that appear in the backgrounds of both substance abusers and those with learning disabilities and behavioral disorders.

Chapter IV
What are the Limits of Our Knowledge?

Research suggests a strong relationship between learning and behavior disorders and substance abuse but the precise nature of the link is still unclear. Studying these relationships in children is difficult for both practical and ethical reasons. The results have been a shortage of research in this area or, in the cases where research has been done, serious limitations to the studies.

A major barrier to understanding the link between learning disabilities and behavioral disorders and substance abuse is the imprecision of definitions. Many different learning deficits are grouped under the labels of learning disability or behavioral disorder.[98] While the number of children in America with these conditions is large, the number of children suffering from any single type of disability is often small.

To determine whether there is a link between a specific category of learning disability and substance abuse, a well-designed scientific study would require the observation of a large number of children with that particular disability. Because of this problem, researchers combine separate categories of disabilities to achieve an adequate sample size. This technique makes it virtually impossible to determine the precise nature of a link between the two and to identify the specific type of deficit associated with it.

From a practical perspective, however, even if a large enough study population could be defined, there is no guarantee that enough parents of learning disabled children could be convinced of having their child participate in a study. Even if a sufficient number of parents would agree, federal standards requiring protection of children as research subjects could still present barriers.

With sufficient financial resources, however, researchers could gather large enough samples and produce well-designed studies that could begin to shed more light on the interconnections of these disorders. As evidenced by the large nunber of unanswered questions in this area, however, far more financial resources are

needed.

Much of the data that exist on learning disabilities and substance abuse comes from retrospective studies in which respondents are asked at one point in time to recall things that happened earlier. This approach has the advantage of being less expensive than many other techniques but is plagued by distortions of the research subject' s memory, especially as subjects become older and move further from the relevant period in childhood. Self-reporting of information is a related problem inherent in many surveys on drug use.[99]

When learning disabilities also are present, a new set of problems may arise: learning disabled individuals may lack the reading or writing skills necessary to provide satisfactory answers to survey questions.[100]

Chapter V
Where Do We Go From Here?

While the clues and theories discussed above represent suggestive evidence of a link between substance abuse, learning disabilities and behavioral disorders, they do not provide adequate evidence to inform policy and practice. They do, however, provide a framework for future research and signal the importance of increased awareness on the part of parents, physicians, teachers and treatment providers as well as the research community.

In conducting studies in this area, researchers will have to overcome a resistance by some professionals in the field of learning and behavioral disorders to examine this constellation of issues. Some professionals voice concerns that the only effect of establishing such a link would be to further stigmatize an unfortunate group of children. Resisting this exploration, however, could well foreclose important prevention and treatment opportunities.

Future research on this topic should resist the temptation to lump distinct types of learning disabilities into one category. By combining these distinct problems into one category we risk being unable to identify groups that are truly "at-risk" while drawing erroneous conclusions about the relationship between substance abuse and learning or behavioral disorders.

CASA recommends the following next steps:

- **Conduct Needed Research.** The National Institutes of Health (The National Institute of Alcohol Abuse and Alcoholism, The National Institute of Drug Abuse, The National Institute of Mental Health, and The National Institute of Child Health and Development) should set forth a research agenda to further our understanding of the links among these conditions and the pathways of development, and make funds available to support the research.

- **Include Older Children in Research Focus.** With the recent attention to preschool children on medication,[101] those in grade school or junior high school may be neglected in future studies. Psychotropic drug use by young children is certainly a compelling subject and one deserving of serious attention; but, given the potential dangers confronting older children, it is critical that supporters of medical research make an effort to fund studies of all children and teens.

- **Refine Diagnostic Criteria.** Additional research should be directed to specifying diagnostic criteria for specific learning disabilities and behavioral disorders.

- **Inform Parents.** Parents should learn the facts. They should be alert to the possibility of learning disabilities and behavioral disorders and deal with them early. They should understand that substance abuse during pregnancy may lead to learning disabilities in their children and that learning or behavioral disorders in their children may exacerbate their own substance abuse problem.

  Parents should learn the risk factors that lead to teen substance abuse and the methods by which the child's learning disability or behavioral disorder may contribute to those risk factors. While parents should be alert to the possibility of substance abuse by children with learning or behavioral disorders, they should not assume that their child will abuse alcohol or drugs. Instead they should focus on preventing and responding to problems of academic failure, low self-esteem and peer rejection that may place them at increased risk for substance abuse.

- **Educate Physicians, Teachers and Treatment Providers.** Teachers, principals and guidance counselors should understand the signs of learning disabilities, behavioral disorders and substance abuse, identify them early and deal with them promptly. They should be able to respond to each condition alone and in combination. Treatment professionals who provide services outside of a school environment need to be attuned to possible learning disabilities or conduct disorders in the children they treat and should tailor treatment to deal with both problems.

NOTES

[1] Abel & Sokol, 1987; Bowles Center for Alcohol Studies, 1998; Streissguth, A. P., Aase, J. M., Clarren, S. K., Randels, S. P., LaDue, R. A., & Smith, D. F. 1991.

[2] Aase, 1994; Abel & Sokol, 1987; Anderson & Novick, 1992; Caruso & ten Bensel, 1993; Clarren, 1988, 1990; Coles, Platzman, Raskind-Hood, Brown, Falek, & Smith., 1997; Coles & Platzman, 1992; Institute of Medicine, Committee to Study Fetal Alcohol Syndrome, 1996; Jacobson, Jacobson & Sokol, 1994; Larroque, Kaminski, Dehaene, Subtil, Delfosse, & Querleu, 1995; The National Center on Addiction and Substance Abuse (CASA) at Columbia University, 1996, 1999; Sokol, 1981; Illustrated manual for nursing practice, 1994; Stratton, Howe, & Battaglia, 1996; Streissguth, 1992, 1994a; Streissguth, Matin, Martin, & Barr, 1981; Streissguth, Clarren, & Jones, 1985; Streissguth, Aase, Clarren, Randels, LaDue, & Smith, 1991; Streissguth, Bookstein, Sampson, & Barr, 1993; Streissguth, Sampson, Olson, Bookstein, Barr, Scott, Feldman, & Mirsky, 1994; Streissguth & LaDue, 1985.

[3] Aronson & Olegard, 1987; Barbour, 1990; Bowles Center for Alcohol Studies, 1998; Blume, 1986; Caruso & ten Bensel, 1993; Sociodemographic and behavioral characteristics associated with alcohol consumption during pregnancy: United States, 1988, (1995); Coles, Platzman, Raskind-Hood, Brown, Falek, & Smith, 1997; Coles & Platzman, 1992; Day, Richardson, Geva, & Robles, 1994; Friedman & Haywood, 1994; Jacobson & Jacobson, 1994; Jones & Smith, 1973; Little & Wendt, 1993; The National Center on Addiction and Substance Abuse (CASA) at Columbia University, 1996, 1999; Smith & Eckardt, 1991; Stratton, et al, 1996; Streissguth, et al., 1991; Streissguth, et al., 1993; Streissguth, et al., 1994; Streissguth & LaDue, 1985; Weiner & Larsson, 1987.

[4] Day, et al., 1994; Jacobson, Jacobson & Sokol, 1994; Little, Asker, Sampson, & Renwick, 1986; The National Center on Addiction and Substance Abuse (CASA) at Columbia University, 1996, 1999; Russell & Skinner, 1988; Sampson, Bookstein, Barr, & Streissguth, 1994; Streissguth, 1994; Weiner & Larson, 1987; Wright, Waterson, Barrison, Toplis, Lewis, Gordon, MacRae, Morris, & Murray-Lyon, 1983.

[5] Aronson & Olegard, 1987; Barbour, 1990; Bowles Center for Alcohol Studies, 1998; Blume, 1986; Sociodemographic and behavioral characteristics associated with alcohol consumption during pregnancy: United States, 1988, (1995); Coles, et al., 1997; Corse & Smith, 1998; Day, et al., 1994; Friedman & Haywood, 1994; Jacobson & Jacobson, 1994; Jones & Smith, 1973; Kodituwakku, Handmaker, N. S., Cutler, Weathersby, & Handmaker, S.D, 1995; Learning Disabilities Association, 1993; Little & Wendt, 1993; Smith & Eckardt, 1991; Steinhausen, Nestler, & Spohr, 1982; Stratton, et al., 1996; Streissguth, 1992; Streissguth, et al., 1985; Streissguth, et al., 1991; Streissguth, et al., 1993; Streissguth, et al., 1994; Streissguth & LaDue, 1985; Aranda & Yaffe, 1987.

[6] Aronson & Olegard, 1987; Barbour, 1990; Bowles Center for Alcohol Studies, 1998; Blume, 1986; Brown, Coles, Smith, Platzman, Silverstein, Erickson, & Falek, 1991; Sociodemographic and behavioral characteristics associated with alcohol consumption during pregnancy: United States, 1988, (1995); Coles, et al., 1997; Corse & Smith, 1998; Day, et al., 1994; Friedman & Haywood, 1994; Stratton, et al., 1996; Jacobson & Jacobson, 1994; Jones & Smith, 1973; Little & Wendt, 1993; Nanson & Hiscock, 1990; Smith & Eckardt, 1991; Steinhausen, et al., 1982; Stratton, et al., 1996; Streissguth, 1992; Streissguth, et al., 1985; Streissguth, Barr, Sampson, Parrish-Johnson, Kirchner, & Martin, 1986; Streissguth, et al., 1991; Streissguth, et al., 1993; Streissguth, et al., 1994; Streissguth & LaDue, 1985; Weinberg, 1997; Weinberg & Glantz, 1999.

[7] Aronson & Olegard, 1987; Azuma, & Chasnoff, 1993; Barbour, 1990; Bowles Center for Alcohol Studies, 1998; Blume, 1986; Brown, et al., 1991; Butler & Goldstein, 1973; Sociodemographic and behavioral characteristics associated with alcohol consumption during pregnancy: United States, 1988, (1995); Chasnoff, Griffith, Freier, & Murray, 1992; Coles, et al., 1997; Corse & Smith, 1998; Day, et al., 1994; Denson, Nanson, & McWatters, 1975; Dunn, McBurney, Ingram, & Hunter, 1977; Eskenazi & Trupin, 1995; Fried, 1993; Fried, Watkinson, & Siegel, 1997; Friedman & Haywood, 1994; Griffith, 1992; Griffith, Azuma, & Chasnoff, 1994; Stratton, et al., 1996; Jacobson & Jacobson, 1994; Jones & Smith, 1973; Kodituwakku, et al, 1995; Kristjansson, Fried, & Watkinson, 1989; Learning Disabilities Association, 1993; Little & Wendt, 1993; Milberger, Biederman, Faraone, & Jones, 1996, 1998; Naeye & Peters, 1984; Nanson & Hiscock, 1990; Nichols & Chen, 1981; Olds, Henderson, & Tatlbaum, 1994; Richardson & Day, 1994; Saxton, 1978; Sexton, Fox, & Hebel, 1990; Smith & Eckardt, 1991; Steinhausen, et al., 1982; Stratton, et al., 1996; Streissguth, 1992; Streissguth, et al., 1985; Streissguth, et al., 1986; Streissguth, et al., 1991; Streissguth, et al., 1993; Streissguth, et al., 1994; Tronick & Beeghly, 1992; Weinberg, 1997; Weinberg & Glantz, 1999; Weitzman, Gortmaker, & Sobol, 1992; Aranda & Yaffe, 1987.

[8] Fox & Forbing, 1991; The National Center on Addiction and Substance Abuse (CASA) at Columbia University, 1996, 1999; Pihl, Peterson, & Finn, 1990; Sher, 1991; Weinberg & Glantz, 1999.

[9] Beitchman & Young, 1997; Bender & Wall, 1994; Bruck, 1986; Bryan, 1991, 1994; Gresham, 1986; Vaughn & Hogan, 1990.

[10] Beitchman, 1999; Beitchman & Young, 1997; Bruck, 1986; Bryan, 1991; Fox & Forbing, 1991; Frick, Kamphaus, Lahey, Loeber, Christ, Hart, & Tannenbaum, 1991; Grande, 1988; Gregory, Shanahan, & Walberg, 1986; Hinshaw, 1992; Huntington & Bender, 1993; Jones, 1985; Kazdin, 1987; Larson, 1988; Lynam, Moffitt, & Stouthamer-Loeber, 1993; McGee, Williams, Share, Anderson, & Silva, 1986; Moffitt, 1993; Moffitt & Silva, 1988; Morrison & Cosden, 1997; Rogers & Saklofske, 1985; Wilens & Biederman, 1993; Zimmerman, Rich, Keilutz, & Broder, 1979.
[11] Greene, Biederman, Faraone, Sienna, & Garcia-Jetton, 1997; Pandina, Johnson, & Labouvie, 1992; Silver, 1999; Weinberg & Glantz, 1999.
[12] Maisto & Carey, 1985; Moore & Polsgrove, 1991; Silver, 1999; Weinberg & Glantz, 1999; Werry, 1986.
[13] Shaywitz, B.A., Fletcher, & Shaywitz, S.E., 1995
[14] Alterman, Petrarulo, Tarter, & McGowen, 1982; Biederman, Wilens, Mick, Faraone, & Spencer, 1998; Carroll & Rounsaville, 1993; De Obaldia, Parsons, & Yohman, 1983; Goodwin, Schulsinger, Hermansen, Guze, & Winokur, 1975; Horner & Scheibe, 1997; Klein, 1998; Milin, Loh, Chow, & Wilson, 1997; Pelham & Lang, 1999; Richardson, 2000; Rounsaville, Anton, Carroll, Budde, Prusoff, & Gawin, 1991; Tarter, McBride, Buonpane, & Schneider, 1977; Whitmore, Mukulich, Thompseon, Riggs, Aarons, & Crowley, 1997; Wilens, 1998; Wood, Wender, & Remherr, 1983.
[15] Biederman, et al., 1998; Richardson, 2000; Wilens, 1998; Wilens, Biederman, & Mick, 1998.
[16] Goodwin, Schulsinger, Hermansen, Guze, & Winokur, 1975; Horner & Scheibe, 1997; Milin, et al., 1997; Richardson, 2000; Wilens, 1998.
[17] Wilens, 1998.
[18] Cosden, 1999; Silver, 1999.
[19] Cosden, 1999.
[20] Silver, 1999.
[21] Harwood, Fountain, Livermore, & The Lewin Group, 1998; The National Center on Addiction and Substance Abuse (CASA) at Columbia University, 1998; The National Center on Addiction and Substance Abuse (CASA) at Columbia University report on American Business, unpublished; The National Center on Addiction and Substance Abuse (CASA) at Columbia University, 2001; Silver, 1989.
[22] Harwood, et al., 1998; The National Center on Addiction and Substance Abuse (CASA) at Columbia University, 1998; The National Center on Addiction and Substance Abuse (CASA) at Columbia University report on American Business, unpublished; The National Center on Addiction and Substance Abuse (CASA) at Columbia University, 2001; Silver, 1989.
[23] Fox & Forbing, 1991; Kress & Elias, 1993; Pandina, Johnson, & Labouvie, 1992; Richardson, 2000; Silver, 1999; Weinberg & Glantz, 1999.
[24] Harwood, et al., 1998; The National Center on Addiction and Substance Abuse (CASA) at Columbia University, 1998; The National Center on Addiction and Substance Abuse (CASA) at Columbia University report on American Business, unpublished; The National Center on Addiction and Substance Abuse (CASA) at Columbia University, 2001; Silver, 1989.
[25] Harwood, et al., 1998; The National Center on Addiction and Substance Abuse (CASA) at Columbia University, 1998; The National Center on Addiction and Substance Abuse (CASA) at Columbia University report on American Business, unpublished; The National Center on Addiction and Substance Abuse (CASA) at Columbia University, 2001.
[26] National Center for Learning Disabilities, 2000a, 2000b.
[27] U.S. Senate and House of Representatives, 1990.
[28] U.S. Senate and House of Representatives, 1990.
[29] American Psychiatric Association, 1994.
[30] American Psychiatric Association, 1994; Learning Disabilities Association [pamphlet](ND).
[31] American Psychiatric Association, 1994.
[32] Beitchman, 1999; Beitchman & Young, 1997; Bender & Wall, 1994; Bruck, 1986; Bryan, 1991, 1994; Fox & Forbing, 1991; Frick, et al., 1991; Grande, 1988; Gregory, et al., 1986; Gresham, 1986; Halperin, Gittelman, Klein, & Rudel, 1984; Hinshaw, 1992; Holborow, & Berry, 1986; Huntington & Bender, 1993; Larson, 1988; Lyon, 1996; McGee, Williams, Share, Anderson, & Ailva, 1986; Mueser, Rosenberg, Drake, Miles, Wolford, Vidaver, & Carrieri, 1999; Moffitt, 1993; Morrison & Cosden, 1997; National Center for Learning Disabilities, 2000a, 2000b; Pihl, et al., 1990; Pihl & Peterson, 1991; Safer & Allen, 1976; Shaywitz, Schnell, Shaywitz, & Towle, 1986; Shaywitz, et al., 1995; Silver, 1981, 1999; Vaughn & Hogan, 1990; Whitmore, Mikulich, Thompseon, Riggs, Aarons, & Crowley, 1997; Wilens & Biederman, 1993; Zimmerman, et al., 1979.
[33] Mueser, et al., 1999; Silver, 1999.

[34] For children with ADHD, their problems are most apparent in, but are not limited to, the classroom environment. In fact, for a child to be diagnosed with ADHD, the symptoms must be present in at least two settings. The name of the disorder can be a source of confusion since a child may suffer from Attention Deficit Disorder (ADD) while not demonstrating any hyperactive behavior. The terms "Attention Deficit Disorder" and "Attention Deficit/ Hyperactivity Disorder" are not exactly interchangeable. We will focus on ADHD in this paper, although some studies cited refer to ADD.

[35] American Psychiatric Association, 1994.

[36] American Psychiatric Association, 1994.

[37] American Psychiatric Association, 1994.

[38] Pihl & Peterson, 1991.

[39] For example, the symptoms of Anxiety Disorder, Oppositional Defiant Disorder (ODD) and Intermittent Explosive Disorder may overlap with one another, with ADHD and CD and with learning disabilities.

[40] Coles, et al., 1997; Learning Disabilities Association [pamphlet] (ND).

[41] Thorley, 1984.

[42] National Center for Education Statistics, 2000.

[43] Reliable estimates range from as low as five percent to as high as 20 percent of the school age population. One of the lowest but most frequently used estimates, based on the federal definition of learning disabilities from the Individuals with Disabilities Education Act (IDEA), is five percent of the school age population, or 2.7 million (U.S. Department of Education, 1999). According to the National Mental Health Association (NMHA), as many as 15 percent of schoolchildren are affected by learning disabilities (1996). The National Center for Learning Disabilities (NCLD) claims that an estimated 15 percent of the U.S. population have a learning disability, while acknowledging that "some experts believe the amount to be even higher. (*General information packet for adults with learning disabilities*) According to Larry B. Silver, M.D., 10 percent to 20 percent of children and adolescents have a learning disability (2000 February).

[44] C. Keith Conners, Ph.D., M.A. states that past estimates of the prevalence of ADHD have ranged from one percent to 20 percent. (1998 February). Conners mention of the 20 percent figure does not include other behavioral disorders such as Conduct Disorder and Oppositional Defiant Disorder. This serves as the basis for the statement that estimates vary "from one percent to more than 20 percent." Conners goes on to say that "when rigorous research criteria are employed, the figures range between one percent and four percent in North America." (1998 February) The most common estimate of the prevalence of ADHD--given by the U.S. Department of Education (1994), the U.S. Surgeon General (1999), and the National Institute of Mental Health (NIMH) (2000, March)--is three percent to five percent of the school age population. According to the US Surgeon General (1999), citing Shaffer, et. al. 1996, "The prevalence of conduct disorder in 9- to 17-year olds in the community varies from one percent to four percent, depending on how the disorder is defined." Robert J. McMahon and Annette M. Estes give prevalence rates ranging from two percent to nine percent for Conduct Disorder and six percent to 10 percent for Oppositional Defiant Disorder (1997).

[45] Shaywitz, et al., 1995.

[46] Shaywitz, et al., 1995.

[47] Bowman Gray School of Medicine Research Group; Yale Research Group. (as cited in Lyon, 1996).

[48] Royce & Stratchley, 1996.

[49] Center on Addiction and Substance Abuse (CASA) at Columbia University, 1995; CASA estimate based on Harwood, Fountain, Livermore, & The Lewin Group, 1998.

[50] National Institute on Alcohol Abuse and Alcoholism (NIAAA), 1996.

[51] Substance Abuse and Mental Health Service Administration, Office of Applied Studies, 1999.

[52] Harwood, et al., 1998.

[53] Center on Addiction and Substance Abuse (CASA) at Columbia University, 1995; CASA estimate based on Harwood, et al., 1998.

[54] Belenko, Fagan, & Chin, 1991.

[55] The National Center on Addiction and Substance Abuse (CASA) at Columbia University, 1999.

[56] Center on Addiction and Substance Abuse (CASA) at Columbia University, 1995, The National Center on Addiction and Substance Abuse (CASA) at Columbia University, 1999; Harwood, et al., 1998.

[57] U.S. Department of Education, 1997.

[58] Forness, 1998.

[59] Forness, 1998.

[60] Amaro, Fried, Cabral, & Zuckerman, 1990; Berenson, Stiglich, Wilkinson, & Anderson, 1991; Berenson, San Miguel, & Wilkinson, 1992; Gomberg & Nirenberg, 1993; Kantor & Straus, 1989; McFarlane, Parker, Soeken, &

Bullock, 1992; The National Center on Addiction and Substance Abuse (CASA) at Columbia University, 1996, 1999; Parker, McFarlane, & Soeken, 1994.

[61] Davis, 1990; Kelleher, Chaffin, & Hollenberg, 1994; Mitchel & Savage, 1991; The National Center on Addiction and Substance Abuse (CASA) at Columbia University 1996, 1999; Regan, Ehrlich, & Finnegan, 1987;. Wiese, & Daro, 1995.

[62] Blume, 1991; George, Gournic, & McAfee, 1988; The National Center on Addiction and Substance Abuse (CASA) at Columbia University, 1996, 1999; Norris, 1994; Wilsnack, 1995. National Center on Child Abuse Prevention Research, National Committee to Prevent Child Abuse, Wiese, & Daro, 1995.

[63] Learning Disabilities Association [pamphlet] (ND); Silver, 1989.

[64] Beitchman & Young, 1997; Bender & Wall, 1994; Bruck, 1986; Bryan, 1991, 1994; Gresham, 1986; Vaughn & Hogan, 1990.

[65] Center for Substance Abuse Treatment (CSAT), 1998; Hickson, 1999; Moore, 1999; Poulsen, 1991; Silver, 1989; Sloboda, David, & National Institute on Drug Abuse, 1997.

[66] Aronson & Olegard, 1987; Azuma, et al., 1993; Barbour, 1990; Bowles Center for Alcohol Studies, 1998; Blume, 1986; Brown, et al., 1991; Butler & Goldstein, 1973; Sociodemographic and behavioral characteristics associated with alcohol consumption during pregnancy: United States, 1988, (1995); Chasnoff, et al., 1992; Coles, et al., 1997; Corse & Smith, 1998; Day, et al., 1994; Denson, et al., 1975; Dunn, et al., 1977; Eskenazi & Trupin, 1995; Fried, 1993; Fried, et al., 1997; Friedman & Haywood, 1994; Griffith, 1992; Griffith, et al., 1994; Stratton, et al., 1996; Jacobson & Jacobson, 1994; Jones & Smith, 1973; Kodituwakku, et al, 1995; Kristjansson, et al., 1989; Learning Disabilities Association, 1993; Little & Wendt, 1993; Milberger, et al., 1996, 1998; Naeye & Peters, 1984; Nanson & Hiscock, 1990; Nichols & Ta-Chuam, 1981; Olds, et al., 1994; Richardson & Day, 1994; Saxton, 1978; Sexton, et al., 1990; Silver, 1981, 1999 Smith & Eckardt, 1991; Steinhausen, et al., 1982; Stratton, et al., 1996; Streissguth, 1992; Streissguth, et al., 1985; Streissguth, et al., 1986; Streissguth, et al., 1991; Streissguth, et al., 1993; Streissguth, et al., 1994; Tronick & Beeghly, 1992; Wakschlag, Lahey, Loeber, Green, Gordon, & Leventhal, 1997; Weinberg, 1997; Weinberg & Glantz, 1999; Weitzman, et al., 1992; Wilens & Biederman, 1993; Aranda & Yaffe, 1987.

[67] Zito, Safer, dosReis, Gardner, Boles, & Lynch, 2000.

[68] Biederman, Wilens, Mick, Spencer, & Faraone, 1999.

[69] Coyle, 2000.

[70] Pear, 2000.

[71] Fine, 1987; Grilo, Becker, Fehon, Edell, & McGlashan, 1996; Pandina, et al., 1992; Weinberg & Glantz, 1999; Zimmerman, et al., 1979.

[72] Pihl & Peterson, 1991.

[73] Alterman, et al., 1982; Biederman, Faraone, Keenan, Knee, & Tsuang, 1990; Biederman, et al., 1998; Carroll & Rounsaville, 1993; Klein, 1998; Cosden, 1999; De Obaldia, et al., 1983; Fox & Forbing, 1991; Goodwin, et al., 1975; Horner & Sheibe, 1997; Kress & Elias, 1993; Lang, Pelham, Johnston, & Gelernter, 1989; Milin, et al, 1997; Morrison & Cosden, 1997; Pandina, et al., 1992; Pelham & Lang, 1999; Pihl & Peterson, 1991; Richardson, 2000; Rounsaville, et al., 1991; Silver, 1999; Tarter et al, 1977; Weinberg & Glantz, 1999; Whitmore, et al., 1997; Wilens, 1998; Wood, et al, 1983.

[74] Aronson & Olegard, 1987; Azuma, et al., 1993; Barbour, 1990; Bowles Center for Alcohol Studies, 1998; Blume, 1986; Brown, et al., 1991; Butler & Goldstein, 1973; Sociodemographic and behavioral characteristics associated with alcohol consumption during pregnancy: United States, 1988, (1995); Chasnoff, et al., 1992; Coles, et al., 1997; Corse & Smith, 1998; Day, et al., 1994; Denson, et al., 1975; Dunn, et al., 1977; Eskenazi & Trupin, 1995; Fried, 1993; Fried, et al., 1997; Friedman & Haywood, 1994; Griffith, 1992; Griffith, et al., 1994; Stratton, et al., 1996; Jacobson & Jacobson, 1994; Jones & Smith, 1973; Kodituwakku, et al, 1995; Kristjansson, et al., 1989; Learning Disabilities Association, 1993; Little & Wendt, 1993; Milberger, et al., 1996, 1998; Naeye & Peters, 1984; Nanson & Hiscock, 1990; Nichols & Ta-Chuan, 1981; Olds, et al., 1994; Richardson & Day, 1994; Saxton, 1978; Sexton, et al., 1990; Silver, 1981, 1999; Smith & Eckardt, 1991; Steinhausen, et al., 1982; Stratton, et al., 1996; Streissguth, et al., 1985; Streissguth, et al., 1986; Streissguth, et al., 1991; Streissguth, 1992; Streissguth, et al., 1993; Streissguth, et al., 1994; Tronick & Beeghly, 1992; Wakschlag, et al., 1997; Weinberg, 1997; Weinberg & Glantz, 1999; Weitzman, et al., 1992; Wilens & Biederman, 1993; Aranda & Yaffe, 1987.

[75] Barkley, Fischer, Edelbrock, & Smallish, 1990; Beitchman, 1999; Brook, J. S., Cohen, & Brook, D. W., 1998; Bukstein, Brent, & Kaminer, 1989; Fox & Forbing, 1991; Grilo, et al., 1996; Maag, Irvin, Reid, & Vasa, 1994; Maisto & Carey, 1985; Moore & Polsgrove, 1991; Morrison & Cosden, 1997; Mueser, et al., 1999; Pandina, et al., 1992; Pihl, et al., 1990; Pihl & Peterson, 1991; Sher, 1991; Schukitt, M. A., Sweeney, S., & Huey, L. (1987); Silver,

1999; Sluske, Heath, Dinwiddie, Madden, Bucholz, Dunne, Statham, & Martin, 1998; Thorley, 1984; Werry, 1986; Wilens & Biederman, 1993; Wood, 1999.

[76] Center for the Future of Children, 1991; U.S. Department of Health and Human Services, National Institutes of Health & National Institute on Drug Abuse, 1996; South Carolina State Council on maternal, Infant and Child Health, 1991; Vega, Kolody, Hwang, & Noble, 1993.

[77] See endnote 74.

[78] Wakschlag, et al., 1997.

[79] Brook, et al., 1998.

[80] Brown, Tapert, Granholm, & Delis, 2000.

[81] Brook, et al., 1998.

[82] Hawkins, Catalano, & Miller, 1992.

[83] Beitchman, 1999; Beitchman & Young, 1997; Bender & Wall, 1994; Bruck, 1986; Bryan, 1991, 1994; Fox & Forbing, 1991; Frick, et al., 1991; Grande, 1988; Greene, et al., 1997; Gregory, et al., 1986; Gresham, 1986; Halperin, et al., 1984; Hinshaw, 1992; Holborow &Berry, 1986; Huntington & Bender, 1993; Jones, 1985; Kazdin, 1987; Larson, 1988; Lynam, et al., 1993; Lyon, 1996; Maisto & Carey, 1985; McGee, et al, 1986; Mueser, et al., 1999; Moffitt & Silva, 1988; Moore & Polsgrove, 1991; Morrison & Cosden, 1997; National Center for Learning Disabilities, 2000a, 2000b; Pandina, et al., 1992; Pihl, et al., 1990; Pihl & Peterson, 1991; Rogers & Saklofske, 1985; Safer & Allen, 1976; Shaywitz, et al., 1986; Shaywitz, et al., 1995; Silver, 1981, 1999; Vaughn & Hogan, 1990; Weinberg & Glantz, 1999; Werry, 1986; Whitmore, et al., 1997; Wilens & Biederman, 1993; Zimmerman, et al., 1979.

[84] See endnote 83.

[85] Fox & Forbing, 1991; Lyon, 1996; Morrison & Cosden, 1997.

[86] Fox & Forbing, 1991; Kress & Elias, 1993; Pandina, et al., 1992; Richardson, 2000; Silver, 1999; Weinberg & Glantz, 1999.

[87] Fox and Forbing, 1991.

[88] Kress & Elias, 1993.

[89] Richardson, 2000.

[90] Coyle, 2000; Pihl & Peterson, 1991.

[91] Biederman, et al., 1999.

[92] Lang, et al., 1989.

[93] Pelham, Lang, Atkeson, Murphy, Gnagy, Greiner, Vodde-Hamilton, & Greenslade, 1997.

[94] Pelham, Lang, Atkeson, Murphy, Gnagy, Greiner, Vodde-Hamilton, & Greenslade, 1998.

[95] Lang, et al, 1989; Pelham & Lang, 1999.

[96] Biederman, et al., 1990.

[97] Fox & Forbing, 1991; Pihl, et al., 1990; Sher, 1991; Weinberg & Glantz, 1999.

[98] Lyon, 1996; Beitchman & Young, 1997.

[99] Ciesla, Spear, & Skala, 1999; Henriksen & Jackson, 1999.

[100] Moore & Polsgrove, 1991.

[101] Zito, 2000.

REFERENCES

Aase, J. M. (1994). Clinical recognition of FAS: Difficulties of detection and diagnosis. *Alcohol Health and Research World, 18*(1), 5-9.

Abel, E. L., & Sokol, R. J. (1987). Incidence of fetal alcohol syndrome and economic impact of FAS-related anomalies. *Drug and Alcohol Dependence, 19*(1), 51-70.

Alterman, A. I., Petrarulo, E., Tarter, R., & McGowen, J. R. (1982). Hyperactivity and alcoholism: Familial and behavioral correlates. *Addictive Behaviors, 7*, 413-421.

Amaro, H., Fried, L. E., Cabral, H., & Zuckerman, B. (1990). Violence during pregnancy and substance use. *American Journal of Public Health, 80*(5), 575-579.

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders: 4th edition.* Washington, DC: American Psychiatric Association.

Anderson, B., & Novick, E. (1992). *Fetal alcohol syndrome and pregnant women who abuse alcohol: An overview of the issue and the federal response.* Washington, DC: U.S. Department of Health and Human Services, Office of Human Services Policy, Division of Children and Youth Policy.

Aranda, J. V., & Yaffe, S. J. (1987). Editorial: Neuro-behavioral toxicology and teratology: Relevance to learning disabilities. *Developmental Pharmacology and Therapeutics, 10*, 313.

Aronson, M., & Olegard, R. (1987). Children of alcoholic mothers. *Pediatrician, 14*, 57-61.

Azuma, S. D., & Chasnoff, I. J. (1993). Outcome of children prenatally exposed to cocaine and other drugs: A path analysis of three-year data. *Pediatrics, 92*(3), 396-402.

Barbour, B. G. (1990). Alcohol and pregnancy. *Journal of Nurse-Midwifery, 35*(2), 78-85.

Barkley, R. A., Fischer, M., Edelbrock, C., & Smallish, L. (1990). The adolescent outcome of hyperactive children diagnosed by research criteria: I. An 8-year prospective follow-up study. *Journal of the American Academy of Child and Adolescent Psychiatry, 29*(4), 546-557.

Beitchman, J. (1999). *Substance use in adolescents with speech and language impairments.* Paper presented at the CASA-NCLD Conference on Substance Abuse and learning Disabilities, New York, NY.

Beitchman, J. H., & Young, A. R. (1997). Learning disorders with a special emphasis on reading disorders: A review of the past 10 years. *Journal of the American Academy of Child and Adolescent Psychiatry, 36*(8), 1020-1032.

Belenko, S., Fagan, J., & Chin, K. L. (1991). Criminal justice responses to crack. *Journal of Research in Crime and Delinquency, 28*(1), 55-75.

Bender, W. N., & Wall, M. E. (1994). Social-emotional development of students with learning disabilities. *Learning Disability Quarterly, 17*(4), 323-341.

Berenson, A. B., San Miguel, V. V., & Wilkinson, G. S. (1992). Violence and its relationship to substance use in adolescent pregnancy. *Journal of Adolescent Health, 13*(6), 470-474.

Berenson, A. B., Stiglich, N. J., Wilkinson, G. S., & Anderson, G. D. (1991). Drug abuse and other risk factors for physical abuse in pregnancy among white non-Hispanic, black, and Hispanic women. *American Journal of Obstetrics and Gynecology, 164*(6, Pt. 1), 1491-1499.

Biederman, J., Faraone, S. V., Keenan, K., Knee, D., & Tsuang, M. T. (1990). Family-genetic and psychosocial risk factors in DSM-III attention Deficit disorder. *Journal of the American Academy of Child and Adolescent Psychiatry, 29*(4), 526-533.

Biederman, J., Wilens, T. E., Mick, E., Faraone, S. V., & Spencer, T. (1998). Does attention-deficit hyperactivity disorder impact the developmental course of drug and alcohol abuse and dependence? *Biological Psychiatry, 44*, 269-273.

Biederman, J., Wilens, T., Mick, E., Spencer, T., & Faraone, S. V. (1999). Pharmacotherapy of attention-deficit/hyperactivity disorder reduces risk for substance use disorder. *Pediatrics, 104*(2), E290. http://www.pediatrics.org/cgi/content/full/104/2/e20

Blume, S. B. (1986). Is social drinking during pregnancy harmless? There is reason to think not. In B. Stimmel (Ed.), *Controversies in alcoholism and substance abuse* (pp. 209-219). New York, NY: Haworth Press.

Blume, S. B. (1991). Sexuality and stigma: The alcoholic woman. *Alcohol Health and Research World, 15*(2), 139-146.

Bowles Center for Alcohol Studies. (1998). *Alcohol-related birth defects: Fetal alcohol syndrome and fetal alcohol effects.* Retrieved 8/2000 from the World Wide Web: htpp://www.med.unc.edu/alcohol/ed/fas/welcome.htm : University of North Carolina at Chapel Hill.

Brook, J. S., Cohen, P., & Brook, D. W. (1998). Longitudinal study of co-occurring psychiatric disorders and substance use. *Journal of the Academy of Child and Adolescent Psychiatry, 37*(3), 322-330.

Brown, R. T., Coles, C. D., Smith, I. E., Platzman, K. A., Silverstein, J., Erickson, S., & Falek, A. (1991). Effects of prenatal alcohol exposure at school age. II. Attention and behavior. *Neurotoxicology and Teratology, 13*, 369-376.

Brown, S. A., Tapert, S. F., Granholm, E., & Delis, D. C. (2000). Neurocognitive functioning of adolescents: Effects of protracted alcohol use. *Alcoholism, Clinical and Experimental Research, 24*(2), 164-171.

Bruck, M. (1986). Social and emotional adjustments of learning-disabled children: A review of issues. In S. J. Ceci (Ed.), *Handbook of cognitive, social, and neuropsychological aspects of learning disabilities* (*Vol. 1* pp. 361-380). Hillsdale, NJ: Lawrence Erlbaum.

Bryan, T. (1994). The social competence of students with learning disabilities over time: A response to Vaughn and Hogan. *Journal of Learning Disabilities, 27*(5), 304-308.

Bryan, T. (1991). Social problems and learning disabilities. In B. Y. Wong (Ed.), *Learning about learning disabilities* (pp. 195-229). New York, NY: Harcourt Brace Janovich.

Bukstein, O. G., Brent, D. A., & Kaminer, Y. (1989). Comorbidity of substance abuse and other psychiatric disorders in adolescents. *American Journal of Psychiatry, 146*(9), 1131-1141.

Butler, N. R., & Goldstein, H. (1973). Smoking in pregnancy and subsequent child development. *British Medical Journal, 4*, 573-575.

Carroll, K. M., & Rounsaville, B. J. (1993). History and significance of childhood attention deficit disorder in treatment-seeking cocaine abusers. *Comprehensive Psychiatry, 34*(2), 75-82.

Caruso, K., & ten Bensel, R. (1993). Fetal alcohol syndrome and fetal alcohol effects: The University of Minnesota experience. *Minnesota Medicine, 76*, 25-29.

Center on Addiction and Substance Abuse (CASA) at Columbia University. (1995). *Substance abuse and federal entitlement programs.* New York, NY: The National Center on Addiction and Substance Abuse (CASA) at Columbia University.

Center for the Future of Children. (1991). *Drug exposed infants.* In *The future of children* (Vol. 1). Los Altos, CA: David and Lucile Packard Foundation, Center for the Future of Children.

Chasnoff, I. J., Griffith, D. R., Freier, C., & Murray, J. (1992). Cocaine/polydrug use in pregnancy: Two-year follow-up. *Pediatrics, 89*, 284-289.

Children and mental health. (2000). In Mental health: A report of the Surgeon General (pp. 1-12). Retrieved 8/24/00 from the World Wide Web: http://www.surgeongeneral.gov/library/mentalhealth/chapter3/sec4.html.

Ciesla, J. R., Spear, S. F., & Skala, S. Y. (1999). Reliability over time of self-reports given by adolescents and their parents in substance abuse outcome research. *Journal of Child and Adolescent Substance Abuse, 9*(2), 57-73.

Clarren, S. K. (1990). Fetal alcohol syndrome: Diagnosis, treatment and mechanisms of teratogenesis. In R. Bellisario, & G. J. Mizejewski (Eds.), *Transplacental disorders: Perinatal detection, treatment, and management (including pediatric AIDS): Proceedings of the 1988 Albany birth defect symposium XIX* (pp. 37-55). New York, NY: Liss.

Clarren, S. K. (1990). Maternal alcohol ingestion: Effects on the developing fetus. In S. S. Gellis, & B. M. Kagan (Eds.), *Current pediatric therapy 13* (pp. 706-707). Philadelphia, PA: W. B. Saunders.

Coles, C. D., & Platzman, K. A. (1992). Fetal alcohol effects in preschool children: Research, prevention and intervention. In U.S. Department of Health and Human Services, Public Health Service, Alcohol, Drug Abuse and Mental Health Administration, Office for Substance Abuse Prevention *Identifying the needs of drug-affected children: Public policy issues: OSAP prevention monograph 11* (pp. 59-86). Rockville, MD: U.S. Department of Health and Human Services, Public Health Service, Alcohol, Drug Abuse and Mental Health Administration, Office for Substance Abuse Prevention.

Coles, C. D., Platzman, K. A., Raskind-Hood, C. L., Brown, R. T., Falek, A., & Smith, I. E. (1997). A comparison of children affected by prenatal alcohol exposure and attention deficit, hyperactivity disorder. *Alcoholism: Clinical and Experimental Research, 21*(1), 150-161.

Conners, C. K. (1998). Overview of attention deficit hyperactivity disorder. In National Institutes of Health, National Institute on Drug Abuse, Office of Medical Applications of Research (Eds.), *Diagnosis and treatment of attention deficit hyperactivity disorder: Program and abstracts: NIH consensus development conference* (pp. 21-24). Bethesda, MD: National Institutes of Health.

Corse, S. J., & Smith, M. (1998). Reducing substance abuse during pregnancy: Discriminating among levels of response in a prenatal setting. *Journal of Substance Abuse Treatment, 15*(5), 457-467.

Cosden, M. (1999). *Substance abuse and learning disabilities: Theories and findings.* Paper presented at the CASA-NCLD Conference on Substance Abuse and Learning Disabilities, New York, NY.

Coyle, J. T. (2000). Psychotropic drug use in very young children. *JAMA, 283*(8), 1059-1060.

Davis, S. K. (1990). Chemical dependency in women: A description of its effects and outcome on adequate parenting. *Journal of Substance Abuse Treatment, 7*(4), 225-232.

Day, N. L., Richardson, G. A., Geva, D., & Robles, N. (1994). Alcohol, marijuana, and tobacco: Effects of prenatal exposure on offspring growth and morphology at age six. *Alcoholism: Clinical and Experimental Research, 18*(4), 786-794.

De Obaldia, R., Parsons, O. A., & Yohman, R. (1983). Minimal brain dysfunction symptoms claimed by primary and secondary alcoholics: Relation to cognitive functioning. *International Journal of Neuroscience, 20*, 173-182.

Denson, R., Nanson, J. L., & McWatters, M. A. (1975). Hyperkinesis and maternal smoking. *Canadian Psychiatric Association Journal, 20*(3), 183-187.

Dunn, H. G., McBurney, A. K., Ingram, S., & Hunter, C. M. (1977). Maternal cigarette smoking during pregnancy and the child's subsequent development: II. Neurological and intellectual maturation to the age of 61/2 years. *Canadian Journal of Public Health, 68*(January/February), 43-50.

Education of the Handicapped Act Amendments of 1990: Individuals with Disabilities Education Act (IDEA). Pub. L. No. 101-478 (1990).

Eskenazi, B., & Trupin, L. S. (1995). Passive and active maternal smoking during pregnancy, as measured by serum cotinine, and postnatal smoke exposure. II. Effects on neurodevelopment at age 5 years. *American Journal of Epidemiology, 142*(9 Suppl.), S19-S29.

Fine, E. (1987). Are we preparing adolescents with learning disabilities to cope with social issues? *Journal of Learning Disabilities, 20*(10), 633-634.

Forness, S. R. (1998). The impact of attention deficit hyperactivity disorder on school systems. In National Institute of Mental Health, National Institute on Drug Abuse, Office of Medical Applications of Research (Eds.), *Diagnosis and treatment of attention deficit hyperactivity disorder: Program and abstracts: NIH consensus development conference* (pp. 61-73). Bethesda, MD: National Institutes of Health.

Fox, C. L., & Forbing, S. E. (1991). Overlapping symptoms of substance abuse and learning handicaps: Implications for educators. *Journal of Learning Disabilities, 24*(1), 24-31.

Frick, P. J., Kamphaus, R. W., Lahey, B. B., Loeber, R., Christ, M. A., Hart, E. L., & Tannenbaum, L. E. (1991). Academic underachievement and the disruptive behavior disorders. *Journal of Consulting and Clinical Psychology, 59*(2), 289-294.

Fried, P. A. (1993). Prenatal exposure to tobacco and marijuana: Effects during pregnancy, infancy, and early childhood. *Clinical Obstetrics and Gynecology, 36*(2), 319-337.

Fried, P. A., Watkinson, B., & Siegel, L. S. (1997). Reading and language in 9- to 12-year olds prenatally exposed to cigarettes and marijuana. *Neurotoxicology and Teratology, 19*(3), 171-183.

Friedman, S. L., & Haywood, C. (Eds.). (1994). *Developmental follow-up: Concepts, domains, and methods.* San Diego, CA: Academic Press.

George, W. H., Gournic, S. J., & McAfee, M. P. (1988). Perceptions of postdrinking female sexuality: Effects of gender, beverage choice, and drink payment. *Journal of Applied Social Psychology, 18*(15), 1295-1317.

Gomberg, E. S., & Nirenberg, T. D. (1993). *Women and substance abuse.* Norwood, NJ: Ablex.

Goodwin, D. W., Schulsinger, F., Hermansen, L., Guze, S. B., & Winokur, G. (1975). Alcoholism and the hyperactive child syndrome. *Journal of Nervous and Mental Disease, 160*(5), 349-353.

Grande, C. G. (1988). Delinquency: The learning disabled students reaction to academic school failure? *Adolescence, 23*(89), 209-219.

Greene, R. W., Biederman, J., Faraone, S. V., Sienna, M., & Garcia-Jetton, J. (1997). Adolescent outcome of boys with attention deficit/hyperactivity disorder and social disability: Results from a 4-year longitudinal follow-up study. *Journal of Consulting and Clinical Psychology, 65*(5), 758-767.

Gregory, J. F., Shanahan, T., & Walberg, H. (1986). A profile of learning disabled twelfth-graders in regular classes. *Learning Disability Quarterly, 9*(Winter), 33-42.

Gresham, F. M. (1986). Conceptual issues in the assessment of social competence in children. In P. S. Strain, M. J. Guralnick, & H. M. Walker (Eds.),*Children's social behavior: Development, assessment, and modification* (pp. 143-179). New York, NY: Academic Press.

Griffith, D. R. (1992). Prenatal exposure to cocaine and other drugs: Developmental and educational prognoses. *Phi Delta Kappan , 74*, 30-34.

Griffith, D. R., Azuma, S. D., & Chasnoff, I. J. (1994). Three-year outcome of children exposed prenatally to drugs. *Journal of the American Academy of Child and Adolescent Psychiatry, 33*(1), 20-27.

Grilo, C. M., Becker, D. F., Fehon, D. C., Edell, W. S., & McGlashan, T. H. (1996). Conduct disorder, substance use disorders, and coexisting conduct and substance use disorders in adolescent inpatients. *American Journal of Psychiatry, 153*(7), 914-920.

Halperin, J. M., Gittelman, R., Klein, D. F., & Rudel, R. G. (1984). Reading-disabled hyperactive children: A distinct subgroup of attention deficit disorder with hyperactivity? *Journal of Abnormal Child Psychology, 12*(1), 1-14.

Harwood, H., Fountain, D., Livermore, G., & The Lewin Group. (1998). *The economic costs of alcohol and drug abuse in the United States, 1992.* Washington, DC: U.S. Department of Health and Human Services, National Institutes of Health, National Institute on Drug Abuse, National Institute on Alcohol Abuse and Alcoholism, Office of Policy Analysis.

Hawkins, J. D., Catalano, R. F., & Miller, J. Y. (1992). Risk and protective factors for alcohol and other drug problems in adolescence and early adulthood: Implications for substance abuse prevention. *Psychological Bulletin, 112*(1), 64-105.

Henriksen, L., & Jackson, C. (1999). Reliability of children's self-reported cigarette smoking. *Addictive Behaviors, 24*(2), 271-277.

Hickson, L. (1999). *Current prevention / intervention programs.* Paper presented at the CASA-NCLD Conference on Substance Abuse and Learning Disabilities, New York, NY.

Hinshaw, S. P. (1992). Externalizing behavior problems and academic underachievement in childhood and adolescence: Causal relationships and underlying mechanisms. *Psychological Bulletin, 111*(1), 127-155.

Holborow, P. L., & Berry, P. S. (1986). Hyperactivity and learning difficulties. *Journal of Learning Disabilities, 19*(7), 426-431.

Horner, B. R., & Scheibe, K. E. (1997). Prevalence and implications of attention-deficit hyperactivity disorder among adolescents in treatment for substance abuse. *Journal of the American Academy of Child and Adolescent Psychiatry, 36*(1)

Huntington, D. D., & Bender, W. N. (1993). Adolescents with learning disabilities at risk? Emotional well-being, depression, suicide. *Journal of Learning Disabilities, 26*(3), 159-166.

Illustrated manual of nursing practice (2nd ed.). (1994). Springhouse, PA: Springhouse Corporation.

Jacobson, J. L., & Jacobson, S. W. (1994). Prenatal alcohol exposure and neurobehavioral development: Where is the threshold? *Alcohol Health and Research World, 18*(1), 30-36.

Jacobson, J. L., Jacobson, S. W., & Sokol, R. J. (1994). Effects of prenatal exposure to alcohol, smoking, and illicit drugs on postpartum somatic growth. *Alcoholism: Clinical and Experimental Research, 18*(2), 317-323.

Jones, C. J. (1985). Analysis of the self-concepts of handicapped students. *Remedial and Special Education, 6*(5), 32-36.

Jones, K. L., & Smith, D. W. (1972). Recognition of the fetal alcohol syndrome in early infancy. *Lancet, 2*(7836), 999-1001.

Kantor, G. K., & Straus, M. A. (1989). Substance abuse as a precipitant of wife abuse victimizations. *American Journal of Drug and Alcohol Abuse, 15*(2), 173-189.

Kazdin, A. E. (1987). Treatment of antisocial behavior in children: Current status and future directions. *Psychological Bulletin, 102*(2), 187-203.

Kelleher, K., Chaffin, M., & Hollenberg, J. (1994). Alcohol and drug disorders among physically abusive and neglectful parents in a community-based sample. *American Journal of Public Health, 84*(10), 1586-1590.

Klein, R. G. (1998). Alcohol, nicotine, stimulants, and other drugs. In National Institutes of Mental Health, National Institute on Drug Abuse, Office of Medical Applications of Research (Eds.), *Diagnosis and treatment of attention deficit hyperactivity disorder: Program and abstracts: NIH consensus development conference* (pp. 163-174). Bethseda, MD: National Institutes of Health.

Kodituwakku, P. W., Handmaker, N. S., Cutler, S. K., Weathersby, E. K., & Handmaker, S. D. (1995). Specific impairments in self-regulation in children exposed to alcohol prenatally. *Alcoholism: Clinical and Experimental Research, 19*(6), 1558-1564.

Kress, J. S., & Elias, M. J. (1993). Substance abuse prevention in special education populations: Review and recommendations. *Journal of Special Education, 27*(1), 35-51.

Kristjansson, E. A., Fried, P. A., & Watkinson, B. (1989). Maternal smoking during pregnancy affects children's vigilance performance. *Drug and Alcohol Dependence, 24*, 11-19.

Lang, A. R., Pelham, W. E., Johnston, C., & Gelernter, S. (1989). Levels of adult alcohol consumption induced by interactions with child confederates exhibiting normal versus externalizing behaviors. *Journal of Abnormal Psychology, 98*(3), 294-299.

Larroque, B., Kaminski, M., Dehaene, P., Subtil, D., Delfosse, M. J., & Querleu, D. (1995). Moderate prenatal alcohol exposure and psychomotor development at preschool age. *American Journal of Public Health, 85*(12), 1654-1661.

Larson, K. A. (1988). A research review and alternative hypothesis explaining the link between learning disability and delinquency. *Journal of Learning Disabilities, 21*(6), 357-363, 369.

Learning Disabilities Association. (1993). *Learning Disabilities Association resolution on the need for federally mandated developmental neurotoxicity testing to protect human health: Central nervous system development.* Retrieved 3/12/98 from the World Wide Web: http://www.ldanatl.org/positions/neurotoxicity.html: Learning Disabilities Association.

Learning Disabilities Association. (n.d.). *Learning disabilities: What is it?* Pittsburgh, PA : Learning Disabilities Association.

Little, R. E., Asker, R. L., Sampson, P. D., & Renwick, J. H. (1986). Fetal growth and moderate drinking in early pregnancy. *American Journal of Epidemiology, 123*(2), 270-278.

Little, R. E., & Wendt, J. K. (1993). The effects of maternal drinking in the reproductive period: An epidemiologic review. In E. S. Gomberg, & T. D. Nirenberg (Eds.), *Women and substance abuse* (pp. 191-213). Norwood, NJ: Ablex Publishing.

Lynam, D., Moffitt, T., & Stouthamer-Loeber, M. (1993). Explaining the relation between IQ and delinquency: Class, race, test motivation, school failure, or self-control? *Journal of Abnormal Psychology, 102*(2), 187-196.

Lyon, G. R. (1996). Learning disabilities. *The Future of Children: Special Edition For Students With Disabilities, 6*(1), 54-76.

Maag, J. W., Irvin, D. M., Reid, R., & Vasa, S. F. (1994). Prevalence and predictors of substance use: A comparison between adolescents with and without learning disabilities. *Journal of Learning Disabilities, 27*(4), 223-234.

Maisto, S. A., & Carey, K. B. (1977). Origins of alcohol abuse in children and adolescents. In B. B. Lahey, & A. E. Kazdin (Eds.), *Advances in clinical child psychology (Vol. 8*pp. 149-197). New York, NY: Plenum Press.

McFarlane, J., Parker, B., Soeken, K., & Bullock, L. (1992). Assessing for abuse during pregnancy: Severity and frequency of injuries and associated entry into prenatal care. *JAMA, 267*(23), 3176-3178.

McGee, R., Williams, S., Share, D. L., Anderson, J., & Silva, P. A. (1986). The relationship between specific reading retardation, general reading backwardness and behavioral problems in a large sample of Dunedin boys: A longitudinal study from five to eleven years. *Journal of Child Psychology and Psychiatry, 27*(5), 597-610.

McMahon, R. J., & Estes, A. M. (1997). Conduct problems. In E. J. Mash, & L. G. Terdal (Eds.), *Assessment of childhood disorders* (Third ed., pp. 130-193). New York, NY: Guilford Press.

Milberger, S., Biederman, J., Faraone, S. V., & Jones, J. (1998). Further evidence of an association between maternal smoking during pregnancy and attention deficit hyperactivity disorder: Findings from a high-risk sample of siblings. *Journal of Clinical Child Psychology, 27*(3), 352-358.

Milberger, S., Biederman, J., Faraone, S. V., Chen, L., & Jones, J. (1996). Is maternal smoking during pregnancy a risk factor for attention deficit hyperactivity disorder in children? *American Journal of Psychiatry, 153*(9), 1138-1142.

Milin, R., Loh, E., Chow, J., & Wilson, A. (1997). Assessment of symptoms of attention-deficit hyperactivity disorder in adults with substance use disorders. *Psychiatric Services, 48*(11), 1378-1380.

Mitchel, L., & Savage, C. (1991). *The relationship between substance abuse and child abuse.* Chicago, IL: National Committee for Prevention of Child Abuse.

Moffitt, T. E., & Silva, P. A. (1988). IQ and delinquency: A direct test of the differential detection hypothesis. *Journal of Abnormal Psychology, 97*(3), 330-333.

Moore, D. (1999). *Adapting substance abuse programs for the learning disabled.* Paper presented at the CASA-NCLD Conference on Substance Abuse and Learning Disabilities, New York, NY.

Moore, D., & Center for Substance Abuse Treatment. (1998). *Substance use disorder treatment for people with physical and cognitive disabilities: Treatment improvement protocol (TIP) series 29*. Rockville, MD: U.S. Department of Health and Human Services, Public Health Service, Substance Abuse and mental Health Service Administration, Center for Substance Abuse Treatment.

Moore, D., & Polsgrove, L. (1991). Disabilities, developmental handicaps, and substance misuse: A review. *International Journal of the Addictions, 26*(1), 65-90.

Morrison, G. M., & Cosden, M. A. (1997). Risk, resilience, and adjustment of individuals with learning disabilities. *Learning Disability Quarterly, 20*, 43-60.

Mueser, K. T., Rosenberg, S. D., Drake, R. E., Miles, K. M., Wolford, G., Vidaver, R., & Carrieri, K. (1999). Conduct disorder, antisocial personality disorder and substance use disorders in schizophrenia and major affective disorders. *Journal of Studies on Alcohol, 60*, 278-284.

Naeye, R. L., & Peters, E. C. (1984). Mental development of children whose mothers smoked during pregnancy. *Journal of the American College of Obstetricians and Gynecologists 64*(5), 601-607.

Nalty, D. F. (1991). *1991 South Carolina prevalence study of drug use among women giving birth.* Columbia, SC: South Carolina Commission on Alcohol and Drug Abuse.

Nanson, J. L., & Hiscook, M. (1990). Attention deficits in children exposed to alcohol prenatally. *Alcoholism: Clinical and Experimental Research, 14*(5), 656-661.

National Center for Education Statistics. (2000). *Digest of education statistics, 1999.* Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement, National Center for Educational Statistics.

National Center for Learning Disabilities. (2000). *General information packet on learning disabilities.* Retrieved 8/22/00 from the World Wide Web: http://www.ncld.org/brochures/geninfo.html: National center for Learning Disabilities.

National Center for Learning Disabilities. (2000). *Information about learning disabilities.* Retrieved 5/9/00 from the World Wide Web: http://www.ncld.org/ld/info_ld.html: National Center for Learning Disabilities.

The National Center on Addiction and Substance Abuse (CASA) at Columbia University. (1998). *Behind bars: Substance abuse and America's prison population.* New York, NY: The National Center on Addiction and Substance Abuse (CASA) at Columbia University.

The National Center on Addiction and Substance Abuse (CASA) at Columbia University. (1999). *No safe haven: Children of substance-abusing parents.* New York, NY: The National Center on Addiction and Substance Abuse (CASA) at Columbia University.

The National Center on Addiction and Substance Abuse (CASA) at Columbia University. (In preparation). *Report on American business.* Unpublished manuscript: The National Center on Addiction and Substance Abuse (CASA) at Columbia University.

The National Center on Addiction and Substance Abuse (CASA) at Columbia University. (2001). *Shoveling up: The impact of substance abuse on state budgets.* New York, NY : The National Center on Addiction and Substance Abuse (CASA) at Columbia University.

The National Center on Addiction and Substance Abuse (CASA) at Columbia University. (1996). *Substance abuse and the American woman.* New York, NY: The National Center on Addiction and Substance Abuse (CASA) at Columbia University.

National Center on Child Abuse Prevention Research, National Committee to Prevent Child Abuse, Wiese, D., & Daro, D. (1995). *Current trends in child abuse reporting and fatalities: The results of the 1994 annual fifty state survey.* Chicago, IL : National Committee to Prevent Child Abuse.

National Information Center for Children and Youth with Disabilities. (2000).*Reading and learning disabilities.* Retrieved 11/17/00 from the World Wide Web: http://www.nichcy.org/pubs/factshe: National Information Center for Children and Youth with Disabilities .

National Institute of Child Health & Human Development. (2000). *Why children succeed or fail at reading: Research from NICHD's program in learning disabilities.* Retrieved 8/21/00 from the World Wide Web: wysiwyg://151/ http://156.40.88.3/publications/pubs/readbro.htm: National Institute of Child Health & Human development.

National Institute of Mental Health. (2000). *Attention deficit hyperactivity disorder (ADHD): Questions and answers.* Retrieved 8/24/00 from the World Wide Web: http://www.nimh.nih.gov/publicat/adhdqa.cfm: National Institute of Mental Health.

National Institute on Alcohol Abuse and Alcoholism. (1996). *Alcoholism: Getting the facts.* Rockville, MD: National Institutes of Health, National Institute on Alcohol Abuse and Alcoholism.

National Mental Health Association. (2000). *Children's mental health: Learning disabilities.* Retrieved 8/24/00 from the World Wide Web: http://www.nmha.org/infoctr/factsheet/75.cfm: National Mental Health Association.

Nichols, P. L., & Ta-Chuan, C. (1981). *Minimal brain dysfunction: A prospective study.* Hillsdale, NJ: Lawrence Erlbaum Associates.

Norris, J. (1994). Alcohol and female sexuality: A look at expectancies and arisks. *Alcohol Health and Research World, 18*(3), 197-201.

Olds, D. L., Henderson, C. R., & Tatelbaum, R. (1994). Intellectual impairment in children of women who smoke cigarettes during pregnancy. *Pediatrics, 93*(2), 221-227.

Paglia, A., & Room, R. (1999). Preventing substance use problems among youth: A literature review and recommendations. *Journal of Primary Prevention, 20*(1), 3-50.

Pandina, R. J., Johnson, V., & Labouvie, E. W. (1992). Affectivity: A central mechanism in the development of drug dependence. In M. Glantz, & R. Pickens (Eds.), *Vulnerability to Drug Abuse* (pp. 179-209). Washington, DC: American Psychological Association.

Parker, B., McFarlane, J., & Soeken, K. (1994). Abuse during pregnancy: Effects on maternal complications and birth weight in adult and teenage women. *Obstetrics and Gynecology, 84*(3), 323-328.

Pear, R. (2000). *White House seeks to curb pills used to calm the young.* Retrieved 11/6/00 from the World Wide Web: http://www.nexis.com/research/search/doc: The New York Times.

Pelham, W. E., & Lang, A. R. (1999). Can your children drive you to drink? Stress and parenting in adults interacting with children with ADHD. *Alcohol Research and Health, 23*(4), 292-298.

Pelham, W. E., Lang, A. R., Atkeson, B., Murphy, D. A., Gnagy, E. M., Greiner, A. R., Vodde-Hamilton, M., & Greenslade, K. E. (1998). Effects of deviant child behavior on parental alcohol consumption: Stress-induced drinking in parents of ADHD children. *American Journal on Addictions, 7*(2), 103-114.

Pelham, W. E., Lang, A. R., Atkeson, B., Murphy, D. A., Gnagy, E. M., Greiner, A. R., Vodde-Hamilton, M., & Greenslade, K. E. (1997). Effects of deviant child behavior on parental distress and alcohol consumption in laboratory interactions. *Journal of Abnormal Child Psychology, 25*(5), 413-424.

Pihl, R. O., & Peterson, J. B. (1991). Attention-deficit hyperactivity disorder, childhood conduct disporder, and alcoholism. *Alcohol Health and Research World, 15*(1), 25-31.

Pihl, R. O., Peterson, J., & Finn, P. (1990). Inherited predisposition to alcoholism: Characteristics of sons of male alcoholics. *Journal of Abnormal Psychology, 99*(3), 291-301.

Poulsen, M. K. (1992). *Schools meet the challenge: Educational needs of children at risk due to prenatal substance exposure.* Sacramento, CA: California State University, Sacramento; California State Department of Education, Office of Special Education, Sacramento City Unified School District.

Regan, D. O., Ehrlich, S. M., & Finnegan, L. P. (1987). Infants of drug addicts: At risk for child abuse, neglect, and placement in foster care. *Neurotoxicology & Teratology, 9*(4), 315-319.

Richardson, G. A., & Day, N. L. (1994). Detrimental effects of prenatal cocaine exposure: Illusion or reality? *Journal of the American Academy of Child and Adolescent Psychiatry 33*(1), 28-34.

Richardson, W. (2000). *ADD, alcoholism and other addictions.* Retrieved 8/25/00 from the World Wide Web: http://www.ADDult.org/adc.htm: Adult Support of Washington.

Rogers, H., & Saklofske, D. H. (1985). Self-concepts, locus of control and performance expectations of learning disabled children. *Journal of Learning Disabilities, 18*(5), 273-278.

Rounsaville, B. J., Anton, S. F., Carroll, K., Budde, D., Prusoff, B. A., & Gawin, F. (1991). Psychiatric diagnoses of treatment-seeking cocaine abusers. *Archives of General Psychiatry, 48*(1), 43-51.

Royce, J. E., & Scratchley, D. (1996). *Alcoholism and other drug problems.* New York, NY: Free Press.

Russell, M., & Skinner, J. B. (1988). Early measures of maternal alcohol misuse as predictors of adverse pregnancy outcomes. *Alcoholism: Clinical and Experimental Research, 12*(6), 824-830.

Safer, D. J., & Allen, R. P. (1976). *Hyperactive children: Diagnosis and management.* Baltimore, MD: University Park Press.

Sampson, P. D., Bookstein, F. L., Barr, H. M., & Streissguth, A. P. (1994). Prenatal alcohol exposure, birthweight, and measures of child size from birth to age 14 years. *American Journal of Public Health, 84*(9), 1421-1428.

Saxton, D. W. (1978). Behaviour of infants whose mothers smoke in pregnancy. *Archives of Diseases in Childhood, 53*(8), 688.

Schukitt, M. A., Sweeney, S., & Huey, L. (1987). Hyperactivity and the risk for alcoholism. *Journal of Clinical Psychiatry, 48*, 275-277.

Sexton, M., Fox, N. L., & Hebel, J. R. (1990). Prenatal exposure to tobacco: III effects on cognitive functioning at age three. *International Journal of Epidemiology, 19*(1), 72-77.

Shaffer, D., Fisher, P., Dulcan, M. K., Davies, M., Piacentini, J., Schwab-Stone, M. E., Lahey, B. B., Bourdon, K., Jensen, P. S., Bird, H. R., Canino, G., & Regier, D. A. (1996). The NIMH Diagnostic Interview Schedule for Children version 2.3 (DISC-2.3): Description, acceptability, prevalence rates, and performance in the MECA study. *Journal of the American Academy of Child and Adolescent Psychiatry, 35*(7), 865-877.

Shaywitz, B. A., Fletcher, J. M., & Shaywitz, S. E. (1995). Defining and classifying learning disabilities and attention-deficit/hyperactivity disorder. *Journal of Child Neurology, 10* (1), S50 - S57.

Shaywitz, S. E., Schnell, C., Shaywitz, B. A., & Towle, V. R. (1986). Yale Children's Inventory (YCI): An instrument to assess children with attention deficits and learning disabilities I: Scale development and psychometric properties. *Journal of Abnormal Child Psychology, 14*(3), 347-364.

Sher, K. J. (1991). Psychological characteristics of children of Alcoholics: Overview of research methods and findings. In M. Galanter (Ed.),*Recent developments in alcoholism: Children of alcoholics* (pp. 301-326). New York, NY: Plenum Press.

Silver, L. B. (1989). Learning disabilities. *Journal of the American Academy of Child and Adolescent Psychiatry, 28*(3), 309-313.

Silver, L. B. (1999). *Learning disabilities and attention deficit hyperactivity disorder: They don't stand alone.* Paper presented at the CASA-NCLD Conference on Substance Abuse and Learning Disabilities, New York, NY.

Silver, L. B. (2000). *A look at learning disabilities in children and youth: Reading and learning disabilities.* Retrieved from the World Wide Web 12/11/00: http://www.nichcy.org/pubs/factshe/fs17txt.htm: National Information Center for Children and Youth with Disabilities (NICHCY).

Silver, L. B. (1989). Psychological and family problems associated with learning disabilities: Assessment and intervention. *Journal of the American Academy of Child and Adolescent Psychiatry, 28*(3), 319-325.

Silver, L. B. (1981). The relationship between learning disabilities, hyperactivity, distractibility, and behavioral problems: A clinical analysis. *Journal of the American Academy of Child Psychiatry, 20*(2), 385-397.

Sloboda, Z., David, S. L., & National Institute on Drug Abuse. (1997). *Preventing drug use among children: A research-based guide.* Rockville, MD: National Institutes of Health, National Institute on Drug Abuse.

Sluske, W. S., Heath, A. C., Dinwiddie, S. H., Madden, P. A., Bucholz, K. K., Dunne, M. P., Statham, D. J., & Martin, N. G. (1998). Common genetic risk factors for conduct disorder and alcohol dependence. *Journal of Abnormal Psychology, 107*(3), 363-374.

Smith, K. J., & Eckardt, M. J. (1991). The effects of prenatal alcohol on the central nervous system. *Recent Developments in Alcoholism, 9*, 151-164.

Sociodemographic and behavioral characteristics associated with alcohol consumption during pregnancy: United States, 1988. (1995). *Morbidity and Mortality Weekly Report, 44*(13), 261-264.

Sokol, R. J. (1981). Alcohol and abnormal outcomes of pregnancy. *CMA Journal, 125*, 143-148.

Steinhausen, H. C., Nestler, V., & Spohr, H. L. (1982). Development and psychopathology of children with the fetal alcohol syndrome. *Developmental and Behavioral Pediatrics, 3*(2), 49-54.

Stratton, K., Howe, C., & Battaglia, F. (Eds.). (1996). *Fetal alcohol syndrome: Diagnosis, epidemiology, prevention and treatment.* Washington, DC: National Academy Press.

Streissguth, A. P. (1992). Fetal alcohol syndrome and fetal alcohol effects: A clinical perspective of later developmental consequences. In I. S. Zagon, & T. A. Slotkin (Eds.), *Maternal substance abuse and the developing nervous system* (pp. 5-25). New York, NY: Academic Press.

Streissguth, A. P. (1994). A long-term perspective of FAS. *Alcohol Health and Research World, 18*(1), 74-81.

Streissguth, A. P., Barr, H. M., Sampson, P. D., Parrish-Johnson, J. C., Kirchner, G. L., & Martin, D. C. (1986). Attention, distraction and reaction time at age 7 years and prenatal alcohol exposure. *Neurobehavioral Toxicology and Teratology, 8*, 717-725.

Streissguth, A. P., Bookstein, F. L., Sampson, P. D., & Barr, H. M. (1993). *The enduring effects of prenatal alcohol exposure on child development: Birth through seven years, a partial least squares solution* . Ann Arbor, MI: University of Michigan Press.

Streissguth, A. P., Clarren, S. K., & Jones, K. L. (1985). Natural history of the fetal-alcohol syndrome: A 10-year follow-up of eleven patients. *Lancet, 2*(8446), 85-92.

Streissguth, A. P., & LaDue, R. A. (1985). Psychological and behavioral effects in children prenatally exposed to alcohol. *Alcohol Health and Research World, 10*(1), 6-12.

Streissguth, A. P., Matin, D. C., Martin, J. C., & Barr, H. M. (1981). The Seattle longitudinal prospective study on alcohol and pregnancy. *Neurobehavioral Toxicology and Teratology, 3*, 223-233.

Streissguth, A. P., Sampson, P. D., Olson, H. C., Bookstein, F. L., Barr, H. M., Scott, M., Feldman, J., & Mirsky, A. F. (1994). Maternal drinking during pregnancy: Attention and short-term memory in 14-year-old offspring: A longitudinal prospective study. *Alcoholism: Clinical and Experimental Research, 18*(1), 202-218.

Streissguth, A. P., Aase, J. M., Clarren, S. K., Randels, S. P., LaDue, R. A., & Smith, D. F. (1991). Fetal alcohol syndrome in adolescents and adults. *JAMA, 265*(15), 1961-1967.

Substance Abuse and Mental Health Services Administration, & Office of Applied Studies. (1999). *National household survey on drug abuse: Main findings, 1998.* Rockville, MD: U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration.

Tarter, R. E., McBride, H. M., Buonpane, N., & Schneider, D. U. (1977). Differentiation of alcoholics: Childhood history of minimal brain dysfunction, family history and drinking pattern. *Archives of General Psychiatry, 34*, 761-768.

Thorley, G. (1984). Review of follow-up and follow-back studies of childhood hyperactivity. *Psychological Bulletin, 96*(1), 116-132.

Tronick, E. Z., & Beeghly, M. (1992). Effects of prenatal exposure to cocaine on newborn behavior and development: A critical review. In U.S. Department of health and Human Services, Public Health Services, Alcohol, Drug Abuse, and mental Health Administration, Office of Substance Abuse Prevention *Identifying the needs of drug-affected children: Public policy issues: OSAP prevention monograph 11*(pp. 25-48). Rockville, MD: U.S. Department of health and Human Services, Public Health Services, Alcohol, Drug Abuse, and mental Health Administration, Office of Substance Abuse Prevention.

U.S. Department of Education. (1994). *Attention Deficit Disorder: Beyond the myths.* Retrieved 8/24/00 from the World Wide Web: http://www.ldonline.org/ld-indepth: U.S. Department of Education, Office of Special Education and Rehabilitative Services, Division of Innovation and Development, Office of Special Education Programs.

U.S. Department of Education, OSEP. (1997). *Nineteenth annual report to Congress on the implementation of the Individuals with Disabilities Education Act.* Retrieved 12/14/00 from the World Wide Web: http://www.ed.gov/offices/OSERS/OSEP?OSEP98AnlRpt/: U.S. Department of Education, OSEP.

U.S. Department of Health and Human Services, National Institutes of Health, & National Institute on Drug Abuse . (1996). *National pregnancy and health survey: Drug use among women delivering live births, 1992.* Rockville, MD: National Institute on Drug Abuse.

U.S. Senate and House of Representatives. (1990). *Public Law 101-476: Education of the Handicapped Act Amendments of 1990.* Washington D.C.: U.S. Government Printing Office, Superintendent of Documents.

Vaughn, S., & Hogan, A. (1990). Social competence and learning disabilities: A prospective study. In H. L. Swanson, & B. Keogh (Eds.), *Learning Disabilities: Theoretical and research issues* (pp. 175-191). Hillsdale, NJ: Lawrence Earlbaum.

Vega, W. A., Kolody, B., Hwang, J., & Noble, A. (1993). Prevalence and magnitude of perinatal substance exposure in California. *New England Journal of Medicine, 329*(12), 850-854.

Wakschlag, L. S., Lahey, B. B., Loeber, R., Green, S. M., Gordon, R. A., & Leventhal, B. L. (1997). Maternal smoking during pregnancy and the risk of conduct disorder in boys. *Archives of General Psychiatry, 54*, 670-676.

Weinberg, N. Z. (1997). Cognitive and behavioral deficits associated with parental alcohol use. *Journal of the American Academy of Child and Adolescent Psychiatry, 36*(9), 1177-1186.

Weinberg, N. Z., & Glantz, M. D. (1999). Child psychopathology risk factors for drug abuse: Overview. *Journal of Clinical Child Psychology, 28*(3), 290-297.

Weiner, L., & Larsson, G. (1987). Clinical prevention of fetal alcohol effects - a reality: Evidence for the effectiveness of intervention. *Alcohol Health and Research World, 11*(4), 60-63.

Weitzman, M., Gortmaker, S., & Sobol, A. (1992). Maternal smoking and behavior problems of children. *Pediatrics, 90*(3), 342-349.

Werry, J. S. (1986). Organic and substance use disorder. In H. C. Quay, & J. S. Werry (Eds.), *Psychopathological disorders of childhood* (pp. 211-231). New York, NY: Wiley.

Whitmore, E. A., Mikulich, S. K., Thompseon, L. L., Riggs, P. D., Aarons, G. A., & Crowley, T. J. (1997). Influences on adolescent substance dependence: Conduct disorder, depression, attention deficit hyperactivity disorder, and gender. *Drug and Alcohol Dependence, 47*, 87-97.

Wilens, T. E. (1998). ADHD and risk for substance use disorders. In National Institute of Mental Health, National Institute on Drug Abuse, Office of Medical Applications of Research (Eds.), *Diagnosis and treatment of attention deficit hyperactivity disorder: Program and abstracts: NIH consensus development conference* (pp. 181-186). Bethesda, MD: National Institutes of Health .

Wilens, T. E., & Biederman, J. (1993). Psychopathology in preadolescent children at high risk for substance abuse: A review of the literature. *Harvard Review of Psychiatry, 1*(4), 207-218.

Wilens, T. E., Biederman, J., & Mick, E. (1998). Does ADHD affect the course of substance abuse? Findings from a sample of adults with and without ADHD. *American Journal on Addictions, 7*(2), 156-163.

Wilsnack, S. C. (1995). Alcohol use and alcohol problems in women. In A. L. Stanton, & S. J. Gallant (Eds.), *The psychology of women's health: Progress and challenges in research and application* (pp. 381-443). Washington, DC: American Psychological Association.

Wood, D., Wender, P. H., & Reimherr, F. W. (1983). The prevalence of attention deficit disorder, residual type, or minimal brain dysfunction, in a population of male alcoholic patients. *American Journal of Psychiatry, 140*(1), 95-98.

Wood, F. B. (1999). *Neurogenetic pathways from dyslexia to substance abuse in adolescents and adults.* Paper presented at the CASA-NCLD Conference on Substance Abuse and Learning Disabilities, New York, NY.

Wright, J. T., Waterson, E. J., Barrison, I. G., Toplis, P. J., Lewis, I. G., Gordon, M. G., MacRae, K. D., Morris, N. F., & Murray-Lyon, I. M. (1983). Alcohol consumption, pregnancy, and low birthweight. *Lancet, 1*(8326 pt.1), 663-665.

Zimmerman, J., Rich, W. D., Keilutz, I., & Broder, P. K. (1979).*Some observations on the link between learning disabilities and juvenile delinquency.* Williamsburg, VA: National Center for State Courts.

Zito, J. M., Safer, D. J., dosReis, S., Gardner, J. F., Boles, M., & Lynch, F. (2000). Trends in the prescribing of psychotropic medications to preschoolers. *JAMA, 283*(8), 1025-1030.